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WAR MEDICINE

Published Monthly by the American Red Cross Society in France

for the Medical Officers of

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ABSTRACTS

VOL. II, N° 1 PARIS AUGUST 1918

WAR MEDICINE

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RESEARCH SOCIETY REPORTS

THE SEVENTH SESSION OF THE RESEARCH SOCIETY OF THE AMERICAN RED CROSS IN FRANCE

June 28 and 29, 1918, at the Hotel Continental, Paris.

Major Walter B. Cannon, Chairman of the Research Committee, presided throughout the session.

The subject of the first meeting, Friday June 28 at 2 : 00 P. M. was " Wounds of the Chest ". It was discussed by Col. A. B. Saltau, Captain Lockwood, Sir John Rose Bradford, Dr. Duval, Dr. Tuffier and Dr. Petit de Villéon.

On Saturday, June 29, the subject of War Psychoneuroses was discussed by Major Foster Kennedy, Professor Dupré, Professor Roussy, Professor Laignel-Lavastine, Lt.-Colonel Salmon, Major Rheim and others. Resumés of these papers and discussions are published in this number of WAR MEDICINE.

WOUNDS OF THE CHEST

Wounds of the Chest. Colonel P. B. SOLTAU, R. A. M. C., said that the chest wound was the meeting ground for the physician and the surgeon.

Incidence. The chest wound formed on an average 2.5 o/o of all casualties admitted to the casualty clearing stations and, on occasions, it had risen as 3.5 o/o. To deal properly with cases in these numbers he considered that the following preparations were necessary in a casualty clearing station :

A chest team, consisting of a physician and surgeon, who should work in close collaboration, selecting the right type of case for operation, etc.

A ward with 50 beds, of which 20 should be fitted with the Fowler elevating frame. (This would allow for the accommoda[illegible]n

and retention of cases admitted during 48 hours, on an estimated basis of 1000 admissions a day, which might be expected in active times.)

A skilled nursing staff and trained orderlies; apparatus for giving oxygen, preferably Haldane's; if possible, an operating theater attached; immediate access to a bacteriological laboratory and an X-ray plant. It was necessary also to have a systematized method of note-taking and recording, such as that published by the Medical Research Committee.

Mortality. This had been calculated from returns made from the greater part of the British front during the fighting in 1917. It was impossible to be certain of the death rate in the regimental aid post, but such deaths were practically all in the fatally wounded.

At the field ambulance stations it was 7 o/o.

In the casualty clearing stations it was 17.18 o/o, i. e. 15.9 o/o in the 93 remaining cases.

At the Base it was about 6 o/o, i. e. 4.6 o/o in the 77 remaining cases. The total mortality in 100 cases which reached a medical unit was therefore 27.5 o/o.

Causes of Death. These were two-fold — (a) anatomical, (b) septic.

a) This class included gross lesions, with profound shock and hemorrhage, the complicating lesions involving abdomen and other areas, the multiple wounds, and deaths from edema of the lung and asphyxia.

b) The types of infecting organisms had been worked out by Col. Elliot at the Base as follows — gas forming organisms, 48 o/o; streptococci, 40 o/o; and lung organisms 12 o/o. The infected cases in the front area showed much the same distribution of organisms. The streptococcic infections were the most fatal.

In the field ambulance zone the death rate was due entirely to anatomical causes; in the casualty clearing stations it was due both to anatomical and to septic causes, whilst at the base it was entirely septic in origin.

The septic death rate in the casualty clearing stations area was about 26 o/o of all deaths. At one battle it worked out in the proportion of 1 to 3. Gask and Wilkinson found in their series that sepsis caused 31 o/o of the death rate. Applying the figures given as to mortality, it will be seen that of every 100 men wounded in the chest, about 9 die of sepsis. This is the death rate that surgery has the greatest hope of reducing.

Types of Wound. These were classified as tangential, penetrating (or briefly as " E ", entrance wound) and perforating (or " E " and " E ", entrance and exit wounds). The tangential wound,

involving muscle and bone and yet not penetrating the pleura often caused, nevertheless, an intra-thoracic injury — hemothorax, infarction of lung, etc.

The character of the missile was naturally responsible for a great variety of wounds. Large shell fragments would smash many ribs, lacerate the parieties extensively, and destroy a large area of lung. Shell fragments of whatever size were more likely to be retained inside the thorax than bullets. Bullet wounds might also vary greatly in degree. A perforating bullet might traverse the lung and yet cause no discoverable lesion. At times, on the other hand, most extensive injuries were seen. This was due partly to the oscillating movement of the bullet which, in addition to its forward movement and its rotation round the long axis, imparted by the rifling, had potential rotation round its short axis, most marked at the early and late stages of the flight, and made active whenever the missile encountered resistance. This short axis rotation was responsible for many of the so-called " explosive " effects. When it was remembered that the Mauser bullet had, at muzzle velocity, a striking force equal to over 30 foot tons, the extent of the damage caused would be realized.

Nature of Injuries. (*a*) To Parieties. All degrees of muscle and bone injury are met with. As elsewhere in the body, these required treatment surgically, as soon as the patient was in a fit state for operation. It must not be forgotten that the muscles of the shoulder girdle were liable to gas infection, and wounds in that area needed most careful watching. The " stove-in " chest was a term applied to a chest in which many ribs had been fractured and fragments had been driven into the pleura. This formed a most dangerous wound, and one which until recently had been nearly always fatal. Surgery, skilfully performed, would succeed in a certain number of these cases, and, in such a desperate condition, operative measures were justified as constituting practically the only hope, for even if the patient survived the initial shock, fatal sepsis nearly always supervened.

(*b*) To Lung. The conditions set up by injury to the lung were as follows : laceration, hemothorax, and collapse, either singly or in combination. It was impossible in the time available to enter into any discussion as to the physical signs produced by these varying conditions, and time and experience were needed to elucidate the often baffling physical signs. Civil experience of the physical signs in the chest must be largely abandoned.

As regards the lung injury itself, the most common condition was infarction along the track. Happily sepsis in the wounded

lung was not very frequent, as that organ had a remarkable power to deal with infection within its substance.

Both hemothorax and pneumothorax might be derived from external and from pulmonary sources. It was probable that in the majority of cases the blood was poured into the pleural cavity from the lung and not from torn intercostal vessels.

Collapse of the lung was an almost invariable condition, the mechanism of the production was as yet little understood. It appeared to be an active process, and might even be regarded as Nature's method of causing hemostasis and checking the escape of air. A discussion of the mechanism would be impossible in the time available.

One point as regards pneumothorax required emphasis, and that was the condition known as the sucking wound, where air was being drawn in and out of the pleural cavity through the wound. This was a most dangerous condition causing profound shock owing to the constant variation of intra-thoracic pressures, and oscillation of the mediastinum, and rendering the patient very prone to sepsis. Since the practice of closing such a wound at the earliest possible opportunity had been introduced, a great improvement in results had been seen. Nothing was more dramatic than the almost instant relief given by such a closure, which could frequently be done by a couple of skin stitches.

Contralateral Conditions. Particular attention must always be paid to the condition of the unwounded lung, on which so largely depended the fate of the patient. Frequently there was observed an area of collapse, " contralateral collapse ", which varied in degree from a partial deflation to a massive collapse of the lower lobe. Contralateral bronchitis and edema were also very frequent. Stress was laid on these conditions, as their existence was a bar to operation.

Shock. The chest wound was liable to be accompanied by profound shock. Without introducing the controversial subject of acidosis in shock, it might be pointed out that because of the resulting pain, exhaustion, diminished oxygenation from hemorrhage and from loss of ventilating area, forced respiratory movements and impeded circulation, the chest wound was pre-eminently the wound in which the production of acidosis was favored.

Treatment. This huge subject could be dealt with only superficially.

In the line, the following points required attention : cleanliness; the combating of shock by careful warming, taking care not to overdo the " réchauffement "; the relief of pain by morphia or one of its derivatives, such as heroin or omnopon, and by placing the

patient in the position which he himself found most confortable. It must always be remembered that the chest wound is accompanied by psychical disturbance, for nothing so frightens a man as difficulty in breathing, and possibly the sound of air whistling through an open wound. The necessity of closing an open wound must again be mentioned, this is best done by suture, and, where this is impossible, by most careful plugging. The case should be evacuated to a casualty clearing station as soon as the primary shock is overcome, usually in about three or four hours.

At the casualty clearing station :

The first essential is to secure rest. Early examination should be confined to determining that there is neither bleeding nor a sucking wound. More detailed examination may follow in a few hours, when an exact diagnosis as to the conditions present, coupled with X-Ray localization of foreign bodies, etc., should be made.

Sepsis must be continually watched for, both by needling and by observing the constitutional signs. The large hemothorax needs aspiration, which is best done about 48 to 72 hours after wounding. As regards surgery, the following types of wound might be taken as needing operation : the large open wound or the " stove-in " chest, requiring plastic repair, and closure; the large retained foreign body, when accurately localized; the infected chest, which could be treated either by cleansing and closure or by drainage.

When to Evacuate. This is a constant problem especially in times of active fighting. Only certain general indications can be given. In quiet times it is better to evacuate the straightforward cases either at the end of three days or else after ten days. The intervening period is the time when sepsis usually appears, and it is better not to let cases travel during that period.

In rush times, all wounds unaccompanied by extensive parietal injury, in which the hemothorax is not excessive, may be evacuated within 24 hours, provided the primary shock is overcome.

After operation, cases should be retained for at least 10 days.

The open or draining chests travel badly.

Cases should not be evacuated within 24 hours of aspiration.

Colonel Soltau said that it was better to hold all cases until convalescent, but the ideal was rarely attainable, and it was often absolutely essential to evacuate early. The data he had given were to enable officers to select the cases best able to travel. He wished to emphasize that surgical treatment concerned only a small proportion of the cases, that in these the highest skill was necessary, and that for the remainder the painstaking care of a skilled physician was needed.

Early Operative Treatment in Chest Surgery. By Major A. L. Lockwood, R. A. M. C.

The speaker stated that complete intrathoracic operations, such as he was to describe, should be undertaken only in cases likely to prove fatal. There is danger of too general a use of this technic.

Until 1916, expectant treatment of chest wounds was considered sufficient, and even the excision of the parietal wound was not undertaken unless it was badly infected. It was soon recognized, however, that chest wounds involving the diaphragm and abdomen demanded immediate operation, but that they were not necessarily fatal. The repair of the diaphragm was observed to be more urgent than that of any hollow or solid viscus in the abdomen. In general operation should be undertaken as early as possible.

The procedures finally evolved were : 1. Excision of parietal wound and removal of fragments and (when possible) closing of pleura. No attempt was made to clear the hemothorax or to follow the missile or to repair the thoracic content.

2. In 1916 repair of the diaphragm by the abdominal route became a routine procedure.

3. When it was found that even without sepsis death resulted usually from badly comminuted parietal fractures, it was made a routine practice to operate immediately all " stove in " chests.

4. The treatment of thoracic wounds of the diaphragm by the thoracic route.

5. In the case of sucking wounds (traumatopnea) which had previously proved invariably fatal, it was found practicable to excise the parietal wound, clear out the hemothorax, and close the chest wall.

Bad cases, especially those with sucking wounds should not be removed from advanced dressing stations until partly rallied. For traumatopnea, the skin should be sutured with silkworm gut through a plug of gauze. As soon as the leakage is stopped, great improvement is at once apparent and the lung tends to expand.

For resuscitation; the patient is placed, if possible, with the injured side dependent. Continuous rectal administration of soda bicarbonate and glucose (5 per cent. each in water) is started. Intravenous soda bicarbonate (2 per cent) may also be given. In severe cases blood transfusion (600 to 800 cc.) is administered.

Hot drinks by mouth, but no stimulants whatever, are given. Sleep should be induced by every possible means. Omnopon or morphin (preferably the former) may be used. Dyspnea from hemothorax or pneumothorax should be relieved before operation by aspirating.

The most perfect operative conditions are essential to success. If operation is undertaken in these severe cases :

1. Operate as soon as patient's condition allows.
2. Operate when *injury to the diaphragm is suspected.*
3. Operate when evacuation will not be necessary.
4. Operate in all cases of open pneumothorax.
5. Operate on all badly "stove in" chests, even if there is no external wound.
6. Operate in all cases where a large missile has traversed the pleural cavity, wherever it may be lodged.
7. Operate on all badly infected wounds, even if the missile is not retained.

Most complete and constant X-ray investigation is necessary. Full size stereoscopic plates should be taken. Early operation on cases showing signs of bronchopneumonia on the uninjured side must not be undertaken lightly and only with local anesthesia.

The speaker insisted upon the exacting nature of operative technique in dealing with such cases.

A separate theatre heated uniformly to 80° F. is reserved for this work. Perfect asepsis is maintained.

If the patient is not plagued with the wounded subsequent, the lung should be grasped with forceps of the Collin pattern; and the displacement of the mediastinum corrected.

The skin is prepared with a 2 per cent. picric acid in spirits. Paravertebral anesthesia is administered two or three segments above and below the wound. A local infiltration at some distance from the wound is employed.

Novocain 1 per cent. and potassium sulphate 0.25 per cent in normal saline, sterilized fresh and repeatedly autoclaved, is injected with a Gray's syringe (10 minims of adrenalin per ounce are added just before use). Gas and oxygen should be available for administration while the hand is inside the chest or when the patient is restless.

The most serious cases may be operated on with a light nitrous oxide analgesia. Local anesthesia combined with gas and oxygen is the best means of preventing shock in extended operations. Neither ether nor chloroform should be used in chest surgery.

When the position of the wound permits, resection of the fourth rib from the mid-clavicular to the posterior axillary line furnishes the easiest access to the thoracic cavity. Resection of the rib should be wide enough to allow careful inspection of the cavity. Doyen's periosteal elevator and costotome are the instruments best suited for the resection of the rib. Tuffier's retractor is useful.

The thoracic cavity must be mopped out with gauze wrung out of hot saline carried on a long curved forceps of the Ochsner pattern.

When a missile has pierced the diaphragm and entered the liver, the diaphragm must be excised widely enough to expose the tract in the liver, and the missile removed. The liver tract should be cleansed with Volkmann's spoon followed by swabs wrung dry out of saline and ether.

If oozing occurs, deep catgut sutures should be inserted with a blunt needle. Mattress sutures suffice to close the diaphragm, except when it is stripped from its parietal attachment. The diaphragm, however, need not be sutured to the chest wall.

It is wise to deal with abdominal wounds after closure of the chest.

Partial lobectomy may be necessary depending on the degree of laceration of the lung. Total lobectomy and excision of both middle and lower lobes of the right lung have been necessary for acute malignant gas gangrene, but it has not saved the patient's life. An open bronchus is rarely found at operation. Crushing and ligaturing with catgut is sufficient.

The visceral surface of the lung should in all cases be approximated, thus mechanically retarding effusion from the damaged lung, and lessening the tendency for infective conditions to light up in the lung substance itself. Hemorrhage from the lung need not be feared.

All foreign bodies and blood clots should be removed from the thoracic cavity. The toilet of the pleura can better be performed by sponging (as in the case of the peritoneum) than by washing out. The last step before closing off the pleural cavity is to sweep round the chest wall, lung, mediastinum, and diaphragm systematically with swabs wrung dry out of hot saline, and, finally with a swab wrung dry out of warmed ether.

The chest should always be closed, unless there is extensive gas gangrene of the lung tissue itself adherent to the chest wall.

Time should not be wasted in attempting to repair the parietal pleura in extensive wounds, as it can rarely be done; such pleura as remains can be caught up with the muscle sutures.

The chest must be hermetically closed with the first layer of muscles, otherwise pocketing will occur, pleural effusion accumulate, the incision break down, and the operation fail. From the time the pleura is opened until it is closed, when the hands of the operator are not actually in the chest, the hole in the pleura should be covered by thick lint wrung dry out of hot saline. This closure is important, even if only for a moment at a time.

Careful approximation of the skin edges is necessary to ensure early and absolute primary union.

A wide gauze dressing with mastisol or " aeroplane dope " reduces the tension on the sutures and binds the layers of the chest wall so as to prevent oozing and pocketing. A binder made of 7 in. adhesive plaster (tying over the dressing) is valuable to retain the dressing, as well as to relax tension on the sutures and leave the sound side of the chest free for expansion; the latter is extremely important.

On completion of the operation, the patient should at once be supported in a semi-recumbent position inclined to the injured side.

The two-stage operation is indicated in the type of case with the entrance and exit wounds far apart -- front and back or lateral — where gross lesion of the bone, or extensive destruction of the tissues, necessitates an extensive operation of both wounds. In such a case, enter the chest through the wound which allows freest access to the pleural cavity and to the part probably damaged. After carrying out the operation as outlined above, leave the patient on the table in a comfortable position, surrounded by hot-water bottles. Give intravenous sodium bicarbonate or blood transfusion as required, administer sodium bicarbonate and glucose 8 oz. per rectum. Half an ampoule of omnopon should be given if the patient is at all restless. After one or two hours, deal with the other wound. For the second stage, a further paravertebral anesthesia is frequently not required — merely local infiltration about the site of the incision.

Injuries of the heart or pericardium can be best dealt with by a parasternal flap of the fourth and fifth, or the fifth and sixth, costal cartilages depending on the probable site of the lesion (the divided cartilages unite rapidly); and this route, in addition, gives free access to the pleural cavity.

Where the missile has passed across the pleural cavity and lodged in the mediastinum, especially high up, it is wiser to enter the mediastinum through the sternum. The missile should be removed, its bed and track thoroughly cleaned, and the pleural opening closed to prevent any leakage from the mediastinum into the pleural cavity. This serves a double purpose — it obliterates a pocket in which pleural effusion might accumulate, and shuts off from the pleural cavity a source of reinfection. It is difficult to deal with the mediastinum through the usual costal incision.

Gross lesions of the parieties under the scapula are always

difficult to reach. It is possible to deal with such wounds from either vertebral or axillary border.

Above all, speed and absolute asepsis are essential to success. The operation must begin with *excisio in toto* of the wound and end with hermetical sealing of the thorax.

In no class of surgery is team work so essential to success. The surgeon, physician, radiographer, and anesthetist should work hand in hand. The theater nurse should be particularly quick and methodical, knowing each step in the operation; and avoiding delay by having everything prepared in advance and at hand. A post-operative nurse, who has had long experience in the nursing of these cases, is a most important member of the team.

Gun Shot Wounds of the Chest as Seen in Hospitals on the Lines of Communication. By Major General Sir JOHN ROSE BRADFORD.

Major General Bradford said in part :

To the physician the main problem in the treatment of these cases is that of forming an accurate diagnosis : first, as to the exact anatomical condition present; and second, as to the presence or absence of infection. For the adequate treatment of these cases it is essential that these patients should be placed in special wards under the care of a physician and a surgeon working together in close cooperation. Gunshot wounds of the chest are usually divided into two classes — the non-penetrating and the penetrating, but it must be remembered that it is by no means always a simple matter to form a correct opinion on any given case. Thus a penetrating or even a through and through wound of the chest may give rise to no appreciable lesion; and non-penetrating wounds may cause such effects as hemoptysis, hemothorax, massive collapse of the lung, pleurisy and pneumonia, most of which are more closely associated with penetrating wounds, and are therefore often regarded as affording conclusive evidence of the penetration of the missile. Further, an apparently trivial wound of some distant part of the body may be the point of entry of a missile that has really penetrated to the chest. Thus hemothorax and even pneumothorax may occur in consequence not only of wounds of the abdomen, but also of wounds of the face, neck, arm, and even, in rare instances, of the buttocks. Again even when the wound of entry is in the chest, the missile may pass through one side of the chest without causing any appreciable lesion on that side and yet cause a hemothorax, or a pneumothorax, on the opposite side.

In other instances, bilateral lesions such as bilateral hemothorax

are produced: in such cases both effusions may be sterile, or both infected, or even one sterile and the other infected.

Diagnosis. As clearly mentioned there are two problems in diagnosis: (1) the exact nature of the lesion present, and (2) the presence or absence of infection.

The anatomical diagnosis must be made on careful study of the physical signs, and verified by exploratory puncture in cases of doubt.

Physical Signs of Hemothorax. — In a sterile or non-infected hemothorax, the chest on the affected side is immobile, often if not always retracted, the heart's apex beat is displaced, and the diaphragm on the affected side is displaced upwards and is immobile. This displacement of the dome of the diaphragm is a sign of considerable importance and is very characteristic of wounds of the chest where either hemothorax or massive collapse is present. Skodaic resonance is an extremely well marked phenomenon in hemothorax. On auscultation, weak breath sounds may be heard, but in many cases tubular or amphoric breathing is very well marked and bronchophony and whispering pectoriloquy are very obvious. In cases of moderate hemothorax the signs, therefore, are very liable to be confounded with those usually regarded as characteristic of consolidations; and a common error is thus made of thinking the patient is suffering from pneumonia, whereas, in reality, a bloody effusion is present in the chest. In cases where the hemothorax is very large in amount the signs present may approximate more closely to those characteristic of ordinary pleural effusion.

In exploratory puncture of the chest in cases of hemothorax, it is essential that the puncture should be made high up and not, as in ordinary pleural effusion, low down. This is necessary on account of the abnormally high position of the diaphragm in hemothorax. If this rule is not followed, grave errors of diagnosis will be made.

In infected hemothorax the physical signs may at first be very silimar to those present in a sterile case, but they tend to increase and to alter rapidly and approximate to those of ordinary pleural effusion. Thus the retraction of the side is replaced by bulging with increased displacement of the heart and the development of increased pain and local tenderness on the affected chest. A more or less sudden and rapid increase in the effusion is in itself strong evidence of infection, but the most characteristic signs are the occurrence of a cracked pot percussion note over what was previously a dull area, and a sudden increase in the degree of displace-

ment of the heart. These signs are due to the development of gas in the pleural cavity as a result of the presence of infection.

Pneumothorax. Pneumothorax is not very common and several varieties of the condition occur. In one form there is a gaping or sometimes a sucking wound of the chest wall; in the former case, the wound in the chest wall may be very large. Two points of interest may be mentioned with reference to these cases. In the first place, the lung in such instances does not usually collapse completely; it may retain approximately the cadaveric volume and this notwithstanding that the hole in the chest wall may be very large—i. e., admit the hand. Secondly, the great distress often present is relieved by the closure of the chest wall wound. In the other variety of pneumothorax, the so-called closed pneumothorax, the lung is usually completely collapsed. This variety of pneumothorax may be sterile or infected, and the latter is by far the most important from the point of view of treatment, as it is essential to recognize its presence without delay and to treat it by opening and cleansing the pleural cavity. A common error of diagnosis is that of regarding an infected pneumothorax as merely an increasing sterile one, i. e., to attribute the patient's distress to a mechanical condition when it is really mainly due to a toxic state. In some cases of infected pneumothorax the pneumothorax is localized and gas is not present in the whole extent of the pleural cavity. This localization is due to the presence of adhesions and in such cases there is usually great displacement of the heart and much distress.

Massive Collapse of the Lung. Collapse of the lung without any hemothorax or pneumothorax occurs in a certain but unknown proportion of gun shot wounds of chest, although it may also occur as a result of wounds of other parts of the body. It occurs not only in penetrating wounds of the chest but also in non-penetrating wounds and some of the most marked and extensive forms of massive collapse have been seen with non-penetrating wounds of the chest.

Collapse may be partial, lobar, or total. The partial form most usually involves the upper part of the lower lobe of one lung but not the apex of the lower lobe. The lobar variety affects usually the entire lower lobe, but cases have been seen where the upper lobe alone was involved. Collapse may occur on the same side as the lesion but there is a remarkable form in which it involves the lung on the side opposite to that wounded and where the wound is entirely unilateral. Some of the most marked examples of con-

trolateral massive collapse have been in cases of quite trivial non-penetrating wounds of the chest wall.

The physical signs of massive collapse are very striking and characteristic. The chest wall is immobile and retracted, the heart is displaced towards the affected side, and the diaphragm is displaced upwards on the affected side. The signs present on auscultation may be divided into three periods :

In the first period there is either weakness or absence of breath sounds over the affected area. During the second stage tubular or even well marked amphoric breathing is heard, and during the third stage this abnormal breathing is accompanied with rales and crepitations.

The physical signs resemble those of pneumonic consolidation: the retraction of the chest wall, the position of the heart and diaphragm give, however, the means of recognizing that collapse, and not pneumonic consolidation, is present. In some instances, as proved by post mortem findings, pneumonia and pleurisy occur as complications of massive collapse. The signs of collapse may sometimes clear up in a few days; in other instances they may persist for as long as three weeks. Massive collapse may coexist with a small hemothorax and such cases often give rise to difficulty in diagnosis.

Infected Hemothorax. Infection of the pleural contents is present in some 25 per cent. of the cases of hemothorax and from the clinical study of the cases, five clinical types may be recognized ;

1. Severe and fulminating cases presenting symptoms that resemble those of secondary hemorrhage or of progressive pneumothorax.

2. Cases with symptoms of a milder type, but with severe, e.g., urgent dyspnea, tachycardia, pain; such cases may be mistaken for pneumonia owing to the fever, dyspnea, and blood-stained sputum.

3. Cases with severe symptoms suggestive of infection, but in which the bacteriological report states that the pleural fluid is sterile.

4. Cases with no urgent symptoms and with little or no pyrexia, but in which the pleural fluid contains organisms and has in some cases an offensive odor.

5. Cases of delayed infection. These cases run a course similar to that of non-infected cases, i. e., have no urgent symptoms for perhaps ten or fourteen days, and then suddenly urgent symptoms characteristic of infection occur.

Complications. True complications are rare except in infected hemothorax, but a number of conditions may be present in cases of

gun shot wounds of the chest that for sake of brevity may be described as complications.

1. Associated injuries, more especially injuries of the spine and of the abdomen. Amongst the latter, wounds of the liver, stomach, and diaphragm are of special importance. Wounds and injuries of the diaphragm are of importance owing to the possible occurrence or later development of herniae.

2. Lesions of the pericardium, and especially hemopericardium, may occur in association with hemothorax and it may even occur with bilateral hemothorax and yet not be fatal. In rare instances a hemopericardium may be not only infected, but gas formation may take place leading to the production of a pneumopericardium. Two such cases are known to the writer that were successfully treated by drainage of the pericardium. True pericarditis is a common complication of infected hemothorax.

3. Aneurism of some large vessel in the neck may be present together with hemothorax or pneumothorax and one instance of traumatic aneurism of the thoracic aorta with hemothorax has fallen under the observation of the writer.

4. Bilateral and contralateral hemothorax are not very rare as a result of a single wound.

5. The most common complications of infected hemothorax are contralateral pleurisy and pneumonia, and pericarditis. Purulent bronchitis is also an important and serious complication.

6. Contralateral collapse may occur as a complication of both sterile and infected hemothorax and, as already mentioned, also in cases of non-penetrating wounds of the chest wall.

It is important to realize that pneumonia is rarely seen as a complication of gun shot wounds of the chest, and when it does occur it is usually in one of two conditions. First, as a complication of wounds of the chest wall without hemothorax where the infection spreads in from the infected wound tract; and, secondly, when it occurs as a contralateral complication of an infected hemothorax.

Diagnosis of the Presence of Infection. Three methods are available for this purpose.

1. *Clinical.* The character of the pyrexia and the type and severity of the symptoms are very useful means. The persistance of distressful dyspnea after the first day or two are suspicious signs and should always lead to the conclusion that infection is present. Furred tongue, delirium, and tachycardia are also of great importance, local tenderness over the sites of the affection is also suspicious. Jaundice is almost always a sign of infection, especially if

marked. In the most severe cases jaundice is intense and may be accompanied by epistaxis and hematemesis. The signs to be relied upon are a rapid increase in the amount of the effusion and especially the development of the signs of the presence of gas in the pleura. The occurrence of complications such as pleurisy and pericarditis is also significant.

The most common errors are to impute the symptoms to secondary hemorrhage, to increasing pneumothorax, or to the supposed presence of pneumonia on the side of the hemothorax when really all the signs are due to toxemia from infection.

2. The examination of the fluid removed by an exploratory puncture is of great importance. Thus this fluid may show abundant polymorphs and also show evidence of marked hemolysis — both these facts are strong evidence of infection even if organisms are not seen. In some cases the foul odor will reveal infection even if organisms are not found.

3. In most cases bacteriological examination reveals the presence of organisms both in smear and culture, but in some cases none are found, although the clinical signs and the cell content of the pleural fluid both suggest the presence of infection. In such cases, where there is a conflict between the clinical and the bacteriological findings, repeated puncture at different levels should be practised, since in some instances the infection is limited by clotting and a focus of infection may be present in clot etc., whereas the main mass of hemothorax fluid is as yet free from infection. The decision in such cases is always difficult, but, if the patient's symptoms are severe, and there is no other cause than the hemothorax to account for them, it is best to regard the case as an infected one, and treat it accordingly, notwithstanding the absence of bacteriological proof.

Treatment of Hemothorax. If the hemothorax is sterile and small in amount no special treatment is required. Aspiration should be employed in all cases of moderate or large size. The fluid should be removed slowly. The oxygen replacement method is of great value, inasmuch as by this means all the bloody effusion can be removed at one sitting with the minimum discomfort to the patient, provided local anesthesia is employed. In the exceptional cases were clotting *en masse* has occurred the chest should be opened and the clot removed, the chest being then closed and subsequently aspiration practised if necessary.

In cases of infected hemothorax there should be no delay in the treatment of the case by surgical methods, such as drainage of the pleura or preferably by cleansing the pleura after the excision of a

long length of rib with immediate closure of the chest and subsequent repeated aspiration.

The only class of case that admits of delay is that in which the patient presents no symptoms and yet the pleural fluid contains organisms. Some of these cases undoubtedly get well if only treated with aspiration, but in many of these the patient's condition is not really satisfactory, the fluid reaccumulates and it is questionable whether it is not better to treat such cases by opening and cleansing the pleura with immediate closure.

The Secondary Surgical Treatment of Chest Wounds. Professor TUFFIER.

The speaker believed that the surgical operations necessitated by the complications which follow wounds of the chest are relatively few. He divided them into the two following classes :

Aseptic complications, which include foreign bodies, hemothorax, pulmonary sclerosis, and ultimately pulmonary tuberculosis; and *Infectious* complications, which are constituted by purulent pleurisy, abscess and gangrene of the lungs.

I. He stated that foreign bodies should be extracted, after the usual process of localization, only when they cause functional troubles which can be definitely traced to their presence.

When the foreign body is aseptic, the phenomena attributed to it, the speaker believed, are really due to *pulmonary sclerosis*. In a great many cases, the functional troubles — pain, dyspnea, and difficulty in respiration — persist in exactly the same degree.

Chronic hemothorax may present either of two forms : an *extensive* effusion, or a *limited interlobar* effusion.

As regards *extensive hemothorax*, diagnosis is made by means of physical examination and the X-ray : successive punctures produce a reddish fluid, the distinctive characteristics of which the speaker has defined elsewhere; they consist in its incoagulability and indefinite reproduction after puncture. He said he had seen it last 12 to 15 months in spite of 27 punctures, with phases of slight fever, considerable debility of the patient, and without infection of any sort.

The seriousness of hemothorax arises not only from its long duration but from the fact that the corresponding side of the thorax collapses, retracts, and brings about a definite deviation of the spine with diminution of the respiratory field — the spirometer demonstrates dyspnea and a precarious general condition.

After a very long time the hemothorax gives way to a probable sclerosis, for the X-ray reveals a considerable thickening of the

pleura, and physical examination shows a diminution of the vesicular murmur. It is generally situated at the base of the pleura and posteriorly.

The speaker said that he has not been able to do much to render the prognosis of this condition more favorable. At present, he treats all cases very early (within from seven weeks to two months), by pleurotomy — evacuation of the fluid — and wide separation of the ribs by means of his "separator". If the chest wall is immobile during respiration and very resistant to the touch he decorticates it. If, on the contrary, the lung is still flexible, he merely opens the wound, thoroughly cleans out all the false membranes and closes the incision, whereupon the pneumothorax thus created heals definitely.

Limited Interlobar Hemothorax. The speaker has known of only 4 cases. The collection has shown under the X-ray, in all the cases, the signs of a hydatic cyst of the lung, i. e., a regular spheroid tumor about the size of a large tangerine orange, absolutely limited, with sharply defined edges, without sclerosis, without condensation of the pulmonary parenchyma, and without any apparent lesion of its periphery. After the puncture, the cavity collapsed to a great extent.

It would seem that in these cases the collection really becomes encysted, and only resorption is necessary to allow the lung to fill out the space occupied by the sanguinary effusion.

As regards a small number of cases of pulmonary *tuberculosis*, the speaker considers them due rather to suppuration, to hospitalization, and to strain, or even to individual predisposition. The tuberculosis often develops in the lung on the side opposite to the lesion. Operation which was performed in one case, was perfectly successful.

II. *Complications Due to Infection in Purulent Effusions of the Pleura.* The speaker and his colleague Depage advocate a method of treating cases of open purulent pleurisy, based on chemical disinfection of the wound followed by closure of the surgical incision, both in medical purulent pleurisy and in post-traumatic surgical suppurations.

a) Treatment of pleural suppuration in unopened cavity (7 cases). This comprises three steps :

Pleurotomy.
Chemical disinfection.
Closure.

1st Step. Pleurotomy. There are two kinds of cases to be consi-

dered, according to whether a pneumococcal purulent pleurisy or a non-pneumococcal suppurative pleurisy is in question.

In the first, is performed simple pleurotomy in the intercostal space. The incision is made at the point where the slope is greatest in the posterior axillary line. The " separator " is placed into the wound, enlarges the orifice, and allows a complete evacuation of the fluid and false membranes to be made.

In the second class of cases, a thoracotomy with resection of a single rib is preferable. It allows of the complete evacuation of all pathological exudates, the *de visu* exploration of the whole of the pleural cavity, and examination of the lung.

The exploration of the pleural cavity is important. Some cavities heal easily and the prognosis is good. Other cavities show deeper recesses which are difficult to fill. Here also the examination of the lung must be made with care.

Illuminating the cavity and examining it through the opening of a purulent pleurisy, it is found that the pleuro-pulmonary fold is much thickened at one point. This part of the pleural fold is excised and decorticated, revealing pulmonary suppuration completely isolated from the pleural cavity.

The last part of the operation is the insertion of Carrel tubes. Seven or eight of these tubes are placed into all the recesses, even the furthermost, in every direction, and fixed to the skin by a piece of adhesive plaster. In certain cases, the speaker has even strengthened them with a silver wire to ensure rigidity and prevent any displacement.

2nd Step. Chemical Disinfection. This is effected directly, by injecting Dakin's fluid into each tube every two hours by means of the rubber bulb. The bacteriological examination, which from the first informs us as to the nature and number of the infective agents, is made by taking a swab once a day from the discharge at three points : the surface, the tract, and the deep recesses.

After a period of from 9 to 30 days at the maximum, the pleural cavity becomes sterile and the surgical wound is closed.

3rd Step. Closure. As soon as sterilization has been effected, the incision is closed by the technic to be described later.

b Treatment of Fistular Purulent Pleurisy (6 medical cases).

The purulent pleurisy has been opened, a fistula remains, and there is a persistent suppuration. These cases, which should have become extinct, are still numerous.

First of all, a bacteriological examination of the discharge is made by swabs taken from three points : 1) the deep part of the cavity; 2) the edges of the fistula; 3) the skin near the wound.

The nature of the discharge being thus established, the treatment is instituted. It comprises three steps, as in the procedure previously described :

1. Débridement and incision of the pleural adhesions;
2. Chemical disinfection;
3. Closure, which is here quite different from the operative method.

1st Step. Débridement and Loosening of the Pleural Adhesions. After débridement of the wound and placing of the "separator", the pleural cavity is explored. The presence of false membranes on the surface of the lung, which is mobile, is then perceived. They may be removed by simple rubbing. The situation, number, and size of the false membranes are then observed, and if the cavity is infected it is only necessary to put in a series of Carrel tubes for the purpose of disinfection.

2nd Step. Chemical Disinfection. This must be carried out with extreme care. It is unfortunately badly supported in the case of bronchial fistulæ, and the Dakin injections frequently give access to everything which should be avoided. Throughout this disinfection the pulmonary inspection is continued daily and methodically. The pleural cavity is measured by the quantity of liquid which can be injected into it, and the rise and fall of the lung is calculated very easily by the difference in volume of the liquid which can be injected during inspiration and expiration.

As soon as the daily bacteriological examination of the secretions shows that sterilization has been obtained (one organism or less in four fields), the thoracic orifice is closed. A little before absolutely certain sterility of the wound is allained, however, it is prudent to suspend the antiseptic treatment and make cultures. For this purpose, after suppression of the tubes a dry dressing is applied to the wound and maintained in position for 24 hours. Three successive swabs are then taken from the depths of the wound, from the edges, and from the neighbouring skin. If all three remain negative the wound is sutured.

3rd Step. Partial or Total Decortication. When the incision in the chest wall has been dilated by means of the " separator, " the false membrane is seen and attacked at its periphery, that is to say, at the point of union of the lung and the thoracic wall. This part of the operation is difficult to perform, and the opening in the chest wall must be large enough to facilitate it. As soon as this disinsertion (for which a bistouri is used) is terminated, a long spatula made especially for the purpose is employed to separate lightly the false membrane. The lung is then seen to mobilize itself throughout the pleuro-costal groove

The pulmonary decortication is then performed, beginning at the outside and proceeding towards the interior, either by median, transversal, or longitudinal section, forming two divisions.

In certain cases this dissection can be made throughout the surface, and the lung is seen to expand out of its shell and fill the thoracic cavity.

The decortication may be complete, the surface of the lung remaining intact — in which case it is a matter not of pleurectomy but solely of *decortication*. A slight bloody discharge and the appearance of a few bubbles of air, in certain cases, demonstrate erosion of the parenchyma.

When this decortication is not possible the false pulmonary membrane must be removed *en bloc* from all points where it can be separated from the lung without too much tearing; and at the others, where it is too adherent, it must be thinned down.

If *absolutely firm adhesions* are found, such as one sees in a traumatic or medical pulmonary lesion, it is generally necessary to abandon them, as inter-pulmonary dissection is too dangerous. In other cases, they are found where nothing can explain the location.

Finally, if a bronchial fistula is discovered it should be closed by Lambert's method of closure.

If the pseudo-membrane of the *pleuro-parietal* fold is easily separable it can be removed; otherwise it may be left without any inconvenience.

4th Step. On termination of the operation the whole of the decorticated surface, after simple compression, remains dry. The fragments are mobilized, and the whole wound closed, either by two rows of stitches, the deeper of catgut and the superficial of silkworm, or by a single row through the skin and muscle.

If there is profuse sanguinary oozing the suture is incomplete. A light gauze dressing, which absorbs and evacuates the blood, is placed on the surface of the lung and the wound is partially closed.

The next day the dressing is removed and the preliminary stitches (previously made through the pleuro-parietal opening so as to allow of discharge) are tightened, and the suture is then complete.

Surgical tendencies are now exactly contrary to those which formerly prevailed; the thoracic cage is no longer placed before the lung in importance, and the lung must always be considered before the chest wall. The advantages are considerable for the functional future of the patient; the lung resumes its normal activity, whereas in the old methods of treatment everything tended to destroy it.

The final results are very interesting. When the cicatrization is complete one can examine the respiration by the measurement of each half of the thorax and by auscultation. In acute cases the final results give a normal respiration unless at the base of the lung. The diaphragmatic costal sinus disappears. In chronic cases the deformation of the thorax remains stationary after one has commenced the treatment of the patient. The respiratory capacity increases after cicatrization. The thorax of the side affected dilates.

Operative Results of Early Surgical Treatment of Wounds of the Lung. By PIERRE DUVAL, Consulting Surgeon of the 7th Army, and E. VAUCHER, Bacteriologist, Autochir. 21.

For the last two years Dr. Duval has treated the wounds of the lungs presenting serious immediate accidents, external or internal bleeding, and opened thorax, by immediate surgical operation on the wound of the lung. For the past year and a half he has operated systematically without compulsion of urgency on certain wounds of the chest to remove the foreign bodies (missile, splinters), to clean surgically the wound of the lung (excision, sweeping suture), to clean the pleura and to treat the wound of the chest wall[1].

The speaker wants to show today the general results of this treatment, the functional results demonstrated by radiological examination of the wounds thus operated.

Without any immediate surgical treatment the total mortality of chest wounds reaches 30 o/o, not including the soldiers who die in the midposts of the regiments :

Through and through wounds	21.2 o/o
Wounds with shell fragment retained.	30.3 "
Wounds with opened thorax.	27 "
Wounds with closed thorax	15 "

These figures are based on 3,453 cases.

The authors' personal statistics of last year including all cases from the field ambulance to the evacuation hospital, all the cases who died without having been operated, those operated on for serious bleeding or opened thorax, those operated systematically, and those not operated, are taken from 161 cases among which there were 27 deaths, a mortality of 16.7 per cent.

1. For the reasons for this treatment, the indications for operating, and the technic, see PIERRE DUVAL, *Les plaies de guerre du poumon*. English translation by Colonel Thompson. Masson et Cie. éditeurs, Paris, 1917.

Of these 27 soldiers who died, 13 were not operated. They died soon after reaching the ambulance in such bad state that nothing could be done to save them. 148 cases could be treated. 14 died. Mortality 10.5 o/o.

Among these 148 cases, 29 were operated on through urgency, either because they were bleeding severely — 16 cases, 9 died — or because the thorax was opened — 13 cases, 4 died — the mortality among these being 13.

The mortality among the cases operated on through urgency was 44.8 per cent.

There were 119 cases which probably would have been treated medically in other ambulances.

102 were treated medically because there was no indication for operating; 5 developed empyema; 1 of them healed perfectly; 1 died of pleural infection — it was the only death among the 102 cases; the 17 remaining cases which presented no urgent indication for operation but which, according to the speaker's personal experience, would probably have developed infection, were nevertheless operated on immediately after reaching the ambulance: the indications for operating being given either by the size of the missile or the injury of the chest wall, fracture of ribs or of scapula, or the importance of the hematoma in the lung. This prophylactic operation consists in:

Removal of the foreign body;

Direct treatment of the wound of the lung;

Bleeding of the pleural cavity;

Careful excision of the wound of the chest wall, which has given the following results.

Death 0.

12 Complete healings with

6 perfect results,

6 very good results.

5 cases with complications after operation:

3 localized empyema containing anaerobic bacilli,

1 empyema of the whole pleural cavity containing streptococci,

1 abscess of the lung.

These 5 cases healed well after a secondary operation had been performed.

The speaker's opinion was that these infections were due to the fact that the wound of the lung had not been thoroughly treated,

incomplete excision, bits of clothing, or splinters remaining in the wound or in the pleura, and the missile not removed.

All operated cases were looked after clinically every day, repeated exploratory punctures were done to test the fluid bacteriologically. Every four or five days, more often if necessary, a radioscopical examination was done at the bed of the patient with the mobile X ray.

In most cases the pneumothorax had disappeared after five or six days and the lung was in close connection with the chest wall. There remained during an average of 15 to 30 days a little shadow diffused through the whole lung or localized in one or two places often in the lower part of the pleura.

If there was some fluid, it often disappeared in eight to ten days. We evacuated the liquid as soon as possible when necessary. In most cases thus treated, the chest was normal, on an average, in from 15 to 30 days — the dilation of the thorax normal, the movement of the diaphragm completely free. In 6 cases there remained a slight general opacity of the wounded side, due probably to thickening of the pleura. The authors have not been able to follow their cases long enough to determine how long this opacity persists.

If there is infection, it is habitually a mild infection; there are one or two loculated pockets in the pleura; serious generalized infection of the whole pleural cavity should be exceptional.

The general impression of such cases is that the quality of the healing is much better than when primitive operation has not been performed.

Conclusions.

Systematic primitive operation on the wound of the lung gives general results much superior to those afforded by medical treatment. The statistics established on 3453 cases treated medically with surgical treatment of the complications give :

Mortality	30 0/0
Pleural infection	25 "
Mortality of pleural infections	40 "

The authors' statistics of last summer including all the cases from the first field ambulance to the Evacuation Hospital, based on 161 cases give :

Mortality	16.7 0/0
Pleural infection	15 "
Mortality of pleural infection	20 "

They believe that, if the indications for operating established in their previous publications are carefully followed, and if the prophylactic operation is done promptly, during the first twelve or twenty-four hours, the bad prognosis of the wounds of the lung will be considerably diminished.

Systematic surgical treatment is the logical and real prophylactic treatment of the infection of the pleura and of the lung. The quality of healing obtained by this method of procedure seems much better than that which is obtained by medical treatment.

Extraction of Projectiles from the Pleura and Diaphragm. By Doctor E. Petit de la Villéon.

The speaker presented conclusions based upon 60 operations for projectiles in the pleura and 16 for projectiles in the diaphragm. He hopes his experience may throw light upon the choice of technic in such cases, which, he considers, are among the most interesting problems of the war. He believes that the technic which he recommends affords a maximum of security and a minimum of useless surgical elaboration.

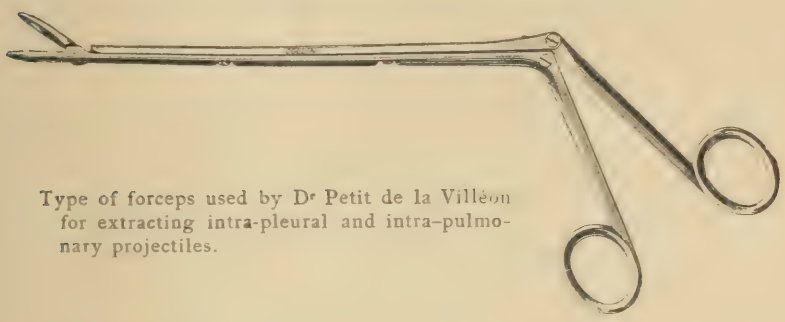
He early abandoned the classic method of thoracotomy in extracting projectiles in the pleura for the simpler method by means of forceps of his own design manipulated under a radioscopic screen and inserted through a small incision. The results thus obtained have been uniformly excellent with a minimum of surgical disturbance and no pneumothorax.

Extensive surgery of the walls and lungs he considers useless so far as healing is concerned; and he regards projectiles lodged in the pleura as essentially mobilizable and therefore disconcerting during an operation, for they change their position in a way to render thoracotomy difficult. When, however, the method of extraction by forceps is employed, the missile may be brought to its normal position by simple manipulation. The X-ray is an indispensable aid in all such work, and a topographic localization of the projectile must be made before any attempt to operate.

The speaker considers this technique equally satisfactory for all pleuro-parietal and pleuro-pulmonary positions of the projectile. Only when the mediastinal pleura are involved does the author consider a large thoracotomy necessary because of the extreme danger of piercing one of the large vessels of the hilum and in order to allow free access and lighting.

In extracting by forceps under a screen the author advises the invariable choice of an extremely oblique direction of approach, with the incision for entry at a considerable distance from the

position of the projectile in the pleura. In this way the ribs will not inside the movements of the forceps. To remove a fragment lodged under the papilla, the incision (1 cm.) for entrance should be made in the anterior axillary region, cutting the *skin* only; and to reach a missile in the posterior pleura under the omoplate, the entrance incision should be made in the posterior axillary region. In case the rounding of the lung itself intervenes between the entrance incision and the projectile to be reached, the lung may be depressed by the forceps sufficiently to permit the projectile to be reached through the cavity. Formerly the speaker in



Type of forceps used by Dr Petit de la Villéon for extracting intra-pleural and intra-pulmonary projectiles.

such cases reached the foreign body by piercing the lung, but he has found such traumatism to be useless; even if it is not dangerous. He states that he is not concerned in this note with suppurating pleura, in which case wide resection and cleansing are necessary.

The speaker has also extracted over 250 intra-pulmonary projectiles by this method; here however, a more exact localization is necessary and care must be taken to assure oneself that the projectile is not in the region of the hilum.

Projectiles in the diaphragm may be reached by various methods accordingly as they are in the right, the left, or the median region. If the projectile is in the right portion of the diaphragm, it can be best reached by the forceps method through an incision made in the thoracic wall allowing the forceps to pass through the pleural cavity. In this region the diaphragm rests upon the liver "as upon a table", facilitating the operation not a little.

When the missile is in the left part of the diaphragm, however, the conditions are very different, owing to the proximity of the stomach and of the splenic flexure of the colon. In such instances an open operation, preferably by the abdominal route is desirable. An oblique left laparotomy along the costal border is the method

recommended. With the use of spreaders, the hand may be admitted freely, and the presence of the missile easily located without the aid of the X-ray.

Similarly in the medial region of the diaphragm, an open operation is requisite. In this case the use of the forceps through a small incision would be folly. For missiles in the phrenitic center or in the posterior region of the diaphragm, the author recommends a high laparotomy, sub-ombilical, medial or oblique.

The writer adds, however, that he does not consider the removal of all projectiles in this region as absolutely necessary. Operations for extractions in the pleura must not be performed until three weeks after the injury.

WAR NEUROSES

On the Nature of Nervousness in Soldiers. Major FOSTER KENNEDY, M. D., F. R. S. (Edin.) Major, R. A. M. C., presented a paper in which he said that for eighteen months the term " shell-shock " has been employed in medical literature and colloquially in the British Army, to cover all cases of nervous instability occurring in the course of war. Under this heading have been massed cases of amnesia, anergic stupor, sleeplessness, nightmare, mutism, functional blindness, tremors, palsies, and further, anxiety neuroses, occurring not only under fighting strain but in individuals who — failing in self-confidence — suffer doubts and apprehensions while still waiting for transport overseas. Further, the term became commonly used in newspaper journalism, whence it passed into common speech, always associated with a train of thought in the mind of the speaker, at once fearful and mysterious.

The general acceptance of this term and the apparent recognition by both medical officers and the public of a concrete and, above all, quite novel condition induced by experiences of unimaginable horror — the " moving accidents of flood and field " — had the obvious result of satisfying many a patient as to the propriety of his ailment; there was inevitably induced in him an easy rationalization of his illness, an easy self-justification in the very label tied to his tunic in the field ambulance, which, in all but the most redoubtable spirits, facilitated acceptance of his fate and to some extent inhibited effort on his own part toward his own cure.

A conscious assumption of symptoms by soldiers is rare; it is *not* rare for a man to go sick for a few hours to obtain a temporary

alleviation of his lot, but very seldom does one meet a man malingering with a view to discharge from service.

The speaker said that much has been written on the theory that the neuroses of war are the result of direct aerial concussion produced by the explosions of heavy shells. Brains have been sectioned belonging to soldiers alleged to have been killed by "commotio cerebri" resulting from such concussion, and petechial hemorrhages have been demonstrated in such brains in the medulla, midbrain, and basal ganglia. One may submit the great difficulty of obtaining accurate details as to the circumstances of death on the field. It is seldom easy to learn whether or not the man killed was buried and asphyxiated though not outwardly wounded; and one should also bear in mind the power of a heavy shell explosion to deoxygenate the air in its vicinity, before coming overrapidly to the conclusion that only the obvious factors of concussion and compression — even to the extent of ten tons to the square yard — are the sole destroying agents involved in the question.

Almost never are generalized psychoneuroses seen in soldiers suffering also from physical wounds.

It is not conceivable that, of two men exposed in equal proximity to a heavy shell burst, he who has no injury can have sustained a greater concussion than he who, for example, has also suffered a transverse lesion of his spinal cord; yet the speaker said he had never seen any sign of nervous instability, — not to say stupor, amnesia, functional abolition of the special senses, or tic, — in any individual at the same time dangerously wounded.

The emotions of fear and pain constitute together our machinery of self-preservation; in most of us, swathed in the cotton-bandages of our civilized lives, but little call is made upon them. Constant exposure to imminent destruction in war produces, however, a tautness of the nervous system, a strain due to powerful excitement and, — as the speaker said — to the organic stress induced by the mobilization of biological instincts heretofore dormant. These instincts of self-preservation do not always — and perhaps not often, — become conscious realizations. The speaker means that men, though in great danger, quite honestly may not feel afraid, their nervous systems may be said to be frightened but their awareness knows no fear.

This submersion of a powerful emotive force below the threshold of consciousness is due partly, perhaps, to the knowledge of the individual of the debilitating effects on his energics of the entrance of fear into his conscious life, but much more, one feels sure, to the inhibitory influence of his morale. Now what is this

thing we call morale? — Is it not the expression in each soldier of his herd-instinct, of his willingness to sacrifice himself for the benefit of his kind, and for the ideals held in common by his country-men and himself? It is a loyalty to his mates, to his officers, to his regiment, to his nation, and, in the last instance, to the ideals of life for which his nation stands, and it is measured by his conscious willingness to suffer, his capacity for sacrifice in the common good. It is a quality born of the tribe, a product of gregariousness and so held socially in good repute. It is constantly expressed in thought — it is a real component of the soldiers conscious intellectual life. The shrinking from loss and the fear of death on the other hand are but rarely scrutinized in their realities; they are anti-social in trend and so are cast, by good citizens, into the limbo of subsconciousness.

The speaker's observations that generalized psycho-neuroses do not coexist with severe somatic injury may not be the opinion of all observers, but such observers are speaking of cases seen after transfer to England, who on, and near the field, exhibited no evidences of nervous unrest. In other words, the neurotic symptoms in such cases developed after the lapse of an interval of days or weeks from the date of injury, which proves conclusively the psychogenetic character of these symptoms; and also the uncomfortable fact that unwise suggestion from medical officers can do much to evolve and perpetuate somatic symptoms of psychic origin.

Further, the subject is confused by inadequate classification. The speaker said he had used the term " generalized psychoneurosis " to include those patients in which inability " to carry on " is the result of their mental and emotional conflicts that have been decided against their higher selves, whose morale has given way before the aggrandizement of their emotions of self-preservation; these are the tremblers, the amnesic, the disoriented, those with night and day dream-deliria, the stuporous; the anxiety-neuroses are a milder type of the same great category, are most often developed in officers, and result from prolonged strain and mental conflict rather than from a single external catastrophe.

Associated with the above symptoms, or more often occurring independently, are various losses or perversions of localized function, usually classed as hysterical stigmata. These may persist after the patient has superficially resumed normal emotional control. On the whole, however, mutism, deafness, functional monoplegia, paraplegia and functional spasms of the limbs are the result of *localized suggestion* rather than of a generalized overwhelming of all the mental and emotional qualities, producing automatism

and the temporary replacement of volitional by instinctive life.

By " localized suggestion " is meant some circumstances calculated to produce in a mind, already apprehensive and strained, a more or less fixed idea of localized injury.

The perversions, and abrogations of function due to localized suggestion do not differ essentially from those seen in all neurological hospitals of civil life. Naturally, the suggestions producing these conditions are of the most varied character and identical disabilities may occur through a minor injury from being struck by flying earth or, as a result of a more serious injury, from the diagnostic or verbal indiscretions of a medical officer.

Almost all injuries of the extremities are accompanied for a short period, at least, by a natural " defence-immobilization " of the limb quite apart from any organic nerve injury. This is a natural reaction from pain in tired individuals — a flesh wound of the upper arm, for instance, easily produces in such men the impression of inability to move the wrist and hand, — and any doubts expressed by a doctor as to whether or not, for example, a brachial plexus injury might not possibly account for the condition of the hand, sow the seeds of a fixed idea which later may assume a very sturdy growth.

This brings us to the vital factor underlying the successful treatment of all somatic expressions of psychical unrest — in a word it is *accurate technical knowledge*, — the power to make a careful physical examination, to weigh evidence with precision and, thereby, to attain correct diagnosis : this is the only power which will give the medical officer sufficient self-confidence to enable him to communicate healing to his patient.

Time and again has one seen a half-doubt in diagnosis prevent a coming together of the minds of doctor and patient : if the medical officer be not *quite* sure of the nature of the condition under review, his ability to cure it will be inhibited by a suspicion of the existence either of an organic nerve lesion, on the one hand, or of a conscious malingering, on the other.

In short, functional motor and sensory palsies, and functional perversions of the special senses are created by suggestion directed towards the affected faculty or member, and are susceptible of cure by like means and by like means only. To differentiate them easily and rapidly from similarly appearing organic conditions is the first and most important step in their treatment, and one which, when taken with firmness and accuracy, will confer on the medical officer the self-confidence and authority to exorcise the system of false ideas which has been the immediate cause of the condition.

We are indebted to Freud and his school for our realization that neurotic symptoms may be produced by the antagonism of mutually incompatible emotional trends. The tremendous mass of material made available by war demonstrates the general rightness of this principle, but still more definitely proves the peculiar wrongness of the details with which the psycho-analysts have applied it, and entirely invalidates their deduction — elaborated as a pontifical dogma — that the sexual instinct in various disguises is the only dynamic force possibly concerned.

Soldiers since the beginning of armies have been clear-eyed in this knowledge. They have not, of course, dealt in the turgid phrases of our schools, but they have felt surely the binding qualities of the herd, and have seen in them the only emotive force fit to overcome in their men the fear of death. They too have known that the cement of the herd is the suggestibility of man and their instrument of suggestion is called discipline.

So in this matter the medical officer has an onerous and difficult task. He acts both for the state and for the soldier and, to deal fairly with both clients, it is vital that he should appreciate the truly psychological character of the problem with which he has to wrestle. Only by so doing can he free his patient of his symptoms and, what is still more important, protect the armies from the contagion of suggestion so apt to sweep through such closely co-ordinated communities, each individual of which is exposed to identical causative conditions.

The essential nature of these ailments having been grasped, they must be classified and christened. The term " shell shock " founded on false premises, has served not only to suggest an incorrect etiology, but, by its pitiful and romantic sound, has tended to perpetuate symptoms and to excite no determination in the mind of the sufferer to recover his control, or, in the fighting man, still to endure. So far is it from making an appeal to conscience or to discipline, that it stifles both, and stultifies effort towards cure.

The name is a mistake : we must be rid of it. Let us have instead a true term which will be neither a compromise nor a technicality, unintelligible to the mind of the soldier.

Hysteria is unsuitable in that its significance to laymen and doctors is not identical, nor does it embrace, for instance, such conditions as the anxiety-neuroses. The simple word " nervousness " comprises all the neurotic manifestations seen in war. It furnishes an appeal to the sense of discipline in the armies, and further promotes the growth of a public opinion, both military

and civil, which would be of the greatest prophylatic and therapeutic power.

This diagnosis would continue to be divided into nervousness (sick) and nervousness (wounded), as now obtains, according to the external conditions to which the man was exposed at the time of break down. This change in military nomenclature would make clear to both soldiers and civilians that such diagnoses need not necessarily be followed by a return to home or to the Base, and would clearly indicate the propriety of dealing with such cases diagnostically and therapeutically in rest camps, and especially work camps, in front areas and on the lines of communication.

The author stated he had only attempted to give in general terms the nature of the problem with which we are confronted. In doing so, only the psychological aspects were regarded, because these mental symptoms can be examined easily, and treated successfully — though empirically — by rest, persuasion, re-education and the restoration of self-confidence through suggestion and discipline. He was not unmindful, however, of the physical changes which, accompanying violent emotional disturbances, result in alterations in the physiological balance of the involuntary nervous system. One cannot yet know whether such reflex and secretory activities are the *cause* or the *result* of mental and emotional stress.

The collection of clinical and experimental data on such phenomena as the functional disorders of cardiac rhythm following emotional tension — or dyspnea accompanied by increased absolute blood acidity, and similar cognate problems may, in the future, throw light on the association or integrative activities of mind and body.

Such data, however, do little, as yet, to reveal the intrinsic nature of mind. In the meantime, to cope adequately with the wastage of health and of armies involved in this question, we must perforce deal with mental phenomena rather than with mind, and apply, with some empiricism, psychological remedies to psychological ills.

The Emotions and the War. Professor DUPRÉ, Member of the Academy of Medicine, Major of first Classe in the Army, said that for several years, he has individualized under the name of " Emotive Constitution " a peculiar mode of lack of poise of the nervous system, characterized by diffuse erethism of the general sensibility, sensorial as well as psychic; by the insufficiency of motor

inhibition reflex and voluntary; and by reactions abnormal in their degree, diffusion, and duration, and their disproportion to the causes which provoke them.

Hypersensitivity, normal in the infant, very frequent in the child (infantile neurosity), disappears in the adult by the progressive development of the inhibitory tracts which assure the equilibrium and stability of the nervous system.

Most frequently constitutional morbid emotivity of hereditary origin may be acquired and arise from pathogenetic causes; from infections toxic and traumatic; and from intense and repeated commotions and emotions.

Emotion, indeed, often renders the nervous system sensitive to ulterior conditions and by a sort of emotive anaphylaxis may create constitutional emotivity. In opposition to these cases one may observe a progressive familiarity with a whole series of emotions, thus conferring, by repetition of effective shocks, a remarkable *emotive immunity*.

The emotive constitution is characterized by a double series of permanent signs, physical and psychical.

A. — Physical Signs.

1. Diffuse hyperreflectivity of the tendons, cutis, and the pupils. Sensorial hyperesthesia with quick, extended, and prolonged motor reactions, especially mimic and vocal.

2. Lack of motor equilibrium : spasmodic visceral movements; pharyngoesophagia, gastroenteric spasm, cytispasm with pollakiuria.

Emotive trembling in its many forms, tremor of the extremities, starting, jumping, shivering, chattering of the teeth, stammering, occasional myoclonies, tics, etc.

3. Functional inhibition and transitory motor impotence — giving way of the legs, relaxation of the sphincters.

4. Circulatory Disturbances : occasional tachycardia, often permanent and paroxystic instability of the pupils, alternate peripheral vasoconstriction and vasodilatation. The relation of the circulatory disturbance to certain forms of arterial hypertension has yet to be determined, above all in subjects not suffering from arteriosclerosis or from renal lesions.

5. Loss of normal balance : objective variations, appreciable by the local thermometer and subjective sensations of heat and cold principally in the extremities.

6. Glandular disturbances : variations, spontaneous or caused

by the emotional shocks of the sudoram, salivary, lacrymal, gastro-intestinal, urinary, genital and biliary secretions.

7. Disturbances of the intervisceral reflexes, by association of spasms, secretory disturbances; functional excitation or inhibition causing abnormal reflexes of one organ or another, along the vago-sympathetic or cerebrospinal route.

B. — Psychical Signs.

Impressionability, nervousness, state of uneasiness, anxiety, irritability, impulsiveness — these morbid states, more or less continuous or intermittent, often paroxysmal, alternate and intermingle and constitute a permanent foundation, a soil in which appear and develop the emotive syndromes: timidity, scruples, doubt obsessions, phobia, anxious states, either simple or delirious, anguish, psychosexual emotive anomalies.

For the most serious cases there are fits of anxious melancholy, chronic states of obsessions, passing to incurable or auto-accusation hypochondria, negativism.

Constitutional emotivity, which, moreover, may be allied to normal or superior states of mind and of feeling, is frequently associated with other morbid states. Debility or lack of balance in the intelligence, sentiments, and will; various anomalies of the visceral sensibility, of mobility, or of intuition. Emotive psychoneurosis is clearly distinct from neurasthenia and hysteria, with which, however, it shows interesting points of resemblance as to association and succession.

The speaker could not in so short a time set forth the points of resemblance of morbid emotivity with neurasthenia, understood, as it should always be, in the primitive sense of Bend and Charcot. Neither could he set forth the relation between emotivity and hysteria.

The war, powerful cause of fatigue and emotion, has multiplied the cases of psychoneurosis, of exhaustion, and of emotivity. However frequent these cases may have been relatively, they are very rare, from an absolute point of view, in proportion to the enormous number of combatants. Among the millions of soldiers of the great war, almost all have not only acquired a remarkable immunity but, moreover, by the development of the highest sentiments of patriotism and of duty, these men submitting voluntarily to the most severe discipline have raised themselves to the most passionate exaltation of courage and of contempt of death.

Among soldiers who by a personal predisposition have succumbed

to emotive shocks due to the circumstances of war, one has observed cases of morbid cowardice with flight and desertion. When the psychiatrist has established the pathological motive in these crimes the subject ought to be declared immediately irresponsible before a court-martial and should be discharged.

Discharge should also be given in the case where emotive shock has caused in the victim psychic disturbances, serious and lasting mental confusion, post confusional dementia of a catatonic or hebephrenic nature.

Outline of American Plans for Dealing with War Neuroses. Lt.-Colonel SALMON, M. R. C., Senior Consultant in Neurology for the A. E. F., said that he was sure that all American medical officers are profoundly grateful for the opportunity to hear at first hand the experiences of their French and British colleagues. Their observations, based upon opinions matured by four years of thoughtful work, are invaluable at this time.

In speaking briefly of some American plans for dealing with the medical and military problems created by the extraordinary prevalence of the war neuroses, the speaker said he desired to emphasize the fact that these plans are, in the main, only adaptations for our own needs of all that has seemed most valuable in the work of our allies.

General Features of American Plans. American officers are under no illusions as to the importance of psychoneuroses in armies in the field nor as to the difficulties to be encountered in managing certain phases of their treatment and control. In this, as in other work of the Medical Department of the A. E. F., the Chief Surgeon regards reduction in the wastage of men as an issue of paramount importance. No one realizes more keenly than he that in the final analysis not ships, nor food, nor anything else will win the war but men — effective fighting men behind bayonets. It is realized, too, that the problems in this field which will soon confront us in almost as large a measure as they have our colleagues must be approached with an open mind not burdened with preconceptions or over-valued ideas. Some of the factors go so deeply into the currents of human life that we are certain to court failure if we attempt to solve them by any rules of thumb or by applying any rigidly formulated administrative plan. We must utilize all the resources that are provided by neurology and psychiatry and add to them a generous portion of common sense.

As the speaker had viewed these problems — in the light of expe-

rience — there have seemed to be three outstanding requirements which must be met as a preliminary to successful attack upon them.

1. A rational attitude toward these disorders on the part of the medical officers, line officers, enlisted men, and the public.

2. A careful sifting of the human material that is to be brought across the Atlantic and fed into the furnace of war.

3. Determination that all which is undertaken from the trenches to the sea shall have for its primary object not the proof, or disproof, of some theory, but the restoration, or conservation, of fighting men for the line.

As to the first requirement we must already admit partial failure. Efforts have been made at home to provide accurate descriptions of the war neuroses. Part of the activities of the Medical Officers' Training Camps has been illustrated by lectures on what " shell shock " is and what it isn't. The cable censorship, upon the request of the Surgeon General's Office, has eliminated the term " shell shock " from despatches from overseas. The term has also been eliminated from the official nomenclature of diseases in use in the A. E. F. In spite of these efforts, however, it seems to be on everybody's tongue. The best that can be hoped for is to sow seeds of distrust as to its fitness or propriety. Nevertheless, efforts are being continued to inform not only medical officers but line officers as to the real nature of war neuroses.

Much more success has been attained in sifting the Army that is now coming into the trenches. This undertaking has been carried on upon a large scale and with carefully planned methods.

In attaining the third of the objects that we have set before us, the necessity of placing the management of the very earliest phases of our problem in expert hands seemed uppermost. We have been profoundly impressed by the experience of the British and French in which certain exigencies of hospital evacuation made it almost impossible at times to keep these cases out of the wards of general hospitals. We have seen, in even our limited experience, these disorders pass from very fluid states into hardest neuroses in the wards of general hospitals.

Our chief reliance in preventing this misadventure is upon the provision of divisional psychiatrists for all tactical divisions. These medical officers are carefully selected with reference to their training and personality. They are not medical consultants to the divisions to which they are attached but just as really members of the divisional sanitary personnel as the officers serving in Field Hospitals, Ambulance Companies, or Regiments. It is their duty

to deal with all these cases at the earliest possible moment and it is believed that it will be practicable to prevent the evacuation to hospitals in the S. O. S. of men with neuroses except upon the divisional psychiatrists.

Already a considerable degree of success has attended this plan. In addition to these duties, the divisional psychiatrists are able to give the division surgeons much assistance in dealing with the psychiatric phases of such problems as delinquency, self-inflicted wounds, etc. Several medical officers serving as divisional psychiatrists are here and it is hoped that they will speak in the discussion of their experiences.

As many beds as are required and can be spared are set aside in one divisional field hospital in each division for these cases. Here work of the greatest value to the Army is carried on and the larger part of the men received in these wards from the trenches are sent back within a week or ten days.

The next provision for dealing with the neuroses is the special hospital — Base Hospital No 117 — in the Zone of Advance. In this hospital all the therapeutic measures found most useful elsewhere are provided.

It is realized, however, that this hospital will be relatively of little service if the cases of war neuroses admitted have already been transformed into " ward neuroses " in the general hospitals. Arrangements have been made, therefore, for conducting an ambulance service from this hospital direct to the field hospitals at the front and for sending attendants by train for patients who cannot be received directly by ambulance.

When patients are ready to return to their organizations, or are so nearly ready that it is necessary to wait for administrative reasons, it is very undesirable to have them transferred to an ordinary convalescent camp where they may succomb to the temptation of bringing to light again symptoms which had disappeared. Therefore Base Hospital 117 has been permitted to establish its own convalescent camp; discharge from which will be directly to the men's own organization.

The important modifications in administrative procedure that had to be made to enable division psychiatrists to carry on their work, and the special hospital at La Fauche to operate in the most efficient manner, have been due to the interest and insight into this very difficult new medico-military problem which have been shown by the Chief Surgeon of the American Expeditionary Forces. He has put the problem squarely up to those who presented the plans for its solution. With the cooperation of every

medical officer we should attain a very considerable degree of success.

Psycho-Neurological Disturbances Affecting the Limbs Observed During the War. Professor G. Roussy, Médecin-Major de 2e classe, Médecin Chef du Centre Neurologique de la 7e Région, Professeur agrégé à la Faculté de Médecine de Paris. The speaker said that among the multitudinous manifestations of a psychoneurological description that the war has revealed, there is a group of disturbances which at the present time gives rise to divergence of opinion of great practical importance, i. e., the contractures or paralyses of the limbs, principally those limited to one segment of a limb and particularly to the extremities (acro-contractures or acro-paralyses).

For more than a year, in collaboration with Dr. Boisseau and Dr. d'Oelsnitz, he has given special attention to the study of these disturbances, and it is the result of their combined work that forms the subject of the present report. Some of it has already been published in various forms, but the remainder is new and will shortly appear in a book which is now in the press[1].

He first discussed the principal clinical types of contracture or of psycho-neurological paralysis which were commonly observed by French neurologists, and then described the nature and pathogenesis of a certain number of these nervous disturbances which have revealed themselves in the course of psychotherapeutical treatment

Clinical types. Psychomotor disturbances affecting a limb may be localized in its distal extremity, its middle third, or its proximal end.

I. *Psychomotor disturbances localized in the distal extremity of a limb. Acroparalyses and acrocontractures.*

1. Absolute paralysis of the hand or foot.
2. Local contractures.

In the case of the hand, the clinical picture comprises two symptomatic elements : 1. A motor element, contracture, paralysis or a combination of the two, with unlimited possibilities of variation, natural or unnatural; 2. Secondary phenomena which, clinically, may be divided into :

a) Lesions of bones and joints and of muscles and tendons. These are rare.

b) Caloric, vasomotor, secretory, trophic, and electric distur-

1. G. Roussy, Boisseau et M. d'Oelsnitz. *Traitement des psycho-névroses de guerre.* Coll. Horizon, Masson, édit., 1918. (En préparation.

bances. These are sometimes absent but are more usually found, either in combination or separately.

In the case of the foot, the condition is one of talipes varus, which, according to the character or predominance of the motor disturbance (contracture or paralysis) one may divide into three categories : 1. Paralytic talipes varus or foot-drop; 2. Reducible talipes varus; 3. Irreducible or blocked talipes, which is an accentuation of category 2.

II. *Psychomotor disturbances localized in the middle third of the limb. Elbow and knee.*

A. *Contractures limited to the elbow or to the knee alone.* These are clinically of two types : 1. the extended type and 2. the flexed type.

1. The extended type is rarely seen as affecting the elbow; in the knee it is not so frequently seen as the flexed type. That it is purely hysterical in origin can be proved by examination under anesthesia and by its amenability to treatment. There is, however, a diversion of this type resulting from an organic lesion and accompanied by secondary hysterical disturbances which can easily be distinguished from the purely pithiatic form by careful examination.

2. The flexed type has very frequently been observed during this war. It may appear under the most diverse forms, and it is for this reason that so many different interpretations have been put upon this class of vicious attitudes. The following is a useful grouping :—

a) Purely functional contractures. These are the least common, and are usually seen only in comparatively recent cases. They are the result of paradoxical wounds more often affecting the foot, the leg, or the thigh than the knee; and more often the shoulder, the forearm, or the hand than the elbow. They do not, as a rule, affect the articulation, and are generally of a hystero-traumatic origin. The clinical signs are limitation of movement, both extensor and flexor, with contracture or paradoxical contraction of the antagonistic muscles when spontaneous or voluntary movements are attempted. Secondary disturbances are common, particularly in cases of long standing. The class is one of vicious attitudes completely reducible by general anesthesia and by psychotherapy.

b) Primary functional contracture with secondary organic troubles of the articulations. This is the type most frequently seen at the present moment in the neurological centres of the interior. The vicious attitude is of the same etiology as the preceding type, and is produced by hystero-traumatism not necessarily

directly affecting the elbow or knee joint. Clinically the condition is difficult and often at first impossible to diagnose. The situation may be summed up as follows :– The vicious position is partially reducible under anesthesia and by means of psycho-therapeutical treatment, and may be progressively reduced by psycho-physiological treatment.

c) Secondary functional contracture (or contraction), with primary articular lesion. From the pathogenic point of view this type is the inverse of the preceding one. Here there is a traumatic lesion or a disease of the elbow or knee which may be traced to its origin. The patient has originally been a " joint case " and has retained a vicious attitude of an antalgic character or one resulting from immobilization.

These various types must, of course, be differentiated from those in which the vicious attitude is totally irreducible under anesthesia and by psychotherapy, that is, cases of purely articular or purely musculo-tendinous lesions.

B. *Contractures of the elbow and knee combined with motor disturbances of other segments of the same limb.* Contracture of the elbow or of the knee may be associated either with a vicious attitude of the distal end (hand or foot) of the same limb, or with a contracture of the proximal end (shoulder or hip).

a) Sling arm. This type is shown clinically by a contracture of the elbow combined with flexion of the hand on the forearm as in pseudo-radial paralysis. It is a form frequently observed in patients whose arms have been too long maintained in slings, and is brought about by psychical fixation of such a position.

b) Crutch leg (flexed knee and talipes equinus).

In both these types examination under anesthesia enables the part played by organic or functional disturbances respectively to be estimated.

III. *Psychomotor disturbances localized in the roots of the limbs, shoulder, and elbow.*

As in the case of the elbow and knee, all flaccid forms which come into the category of brachial or crural monoplegia must be eliminated and only forms in which contractures are present considered.

In the shoulder two forms are seen :

(1) Adduction type, in which the arm is held more or less rigidly to the body, though the elbow, wrist, and fingers move normally. Fairly frequently there is also elevation of the shoulders by contracture of the elevator muscles, a type which is associated with the following, or

(2) Elevation type. This is rarer than the preceding one, especially in its pure, isolated form. Contracture of the trapezius and scalenus fixes the shoulder in forced elevation. Contraction of the sterno-mastoidal often becomes an additional feature in this condition and results in a species of torticolis.

In the hip the following three forms occur :

(1) External rotation and abduction type. This is the most common. There is of course no real shortening of the affected limb.

(2) Flexion type.

(3) Pseudo spring-hip type. This is not so much a nervous form as an anatomical arrangement which allows the subjet to tighten the tendon of the fascia lata on the great trochanter at each step, and to produce or suppress the spring effect at will. As a matter of fact the condition is the first stage of true spring-hip, in which the looseness of the tendons cannot be voluntarily corrected.

As in the case of the knee and elbow, one finds distinct forms according to whether the organic or functional element is predominant.

a) Purely functional contractures. These may be reduced under anesthesia, and recover completely by psychotherapy in the great majority of cases.

b) Primary functional contractures with secondary articular lesions. These are more frequent in the shoulder than the hip. As they are difficult to distinguish from the preceding type, recourse must be had to examination under chloroform. In the same degree as they are only partially reducible under anesthesia according to the established stiffness of the joint, so they are but partially amenable to psychotherapy and only give way progressively to psycho-physiological treatment.

c) Functional contractures (or contractions) secondary to primary lesions of the joints. A purely psycho-neurological element is here superimposed upon a traumatic or spontaneous articular lesion as a result of too long immobilization, habit, or psychic inertia.

Lastly, the contractures we are studying are :

(1) Sometimes limited to the hip or to the shoulder, the vicious attitudes produced in other segments of the limb being temporary and vicarious;

(2) Sometimes, on the other hand, such vicarious attitudes are themselves fixed as the result of later and additional functional disturbances, in the form of limb paralysis or of contracture.

As regards the nature of the motor disturbance, it is pithiatic and

may be reproduced or maintained at will by the patient. It is liable to disappear suddenly by persuasion.

In our experience, these objections are either unjustified in practice or originate in factors which oppose, in one way or another, the treatment applied.

Among the disturbances classed as reflex are *sensory disturbances*, or anesthesia and hyperesthesia. In our opinion, however severe these affections may be, they are all hysterical in character. In some cases they may be real in that they are due to a stiffness of an articulation, particularly in the phalanges; but when treatment has improved the condition of the joint, the sensory trouble disappears.

Vasomotor, thermic, and secretory disturbances are frequently, but not always, observed in connection with paralysed or contracted extremities. They appear to be caused by the immobilization or the vicious attitude acquired by a limb or segment of a limb, and in proof of this theory we would urge the fact that on the return of the physiological mobility these troubles either disappear completely or are considerably improved.

Mechanical or electrical hypersensitiveness of the muscles and nerves and modifications of the cutaneous reflexes is believed to be due to hypothermia and disturbances of the circulation. They are increased by cold, and become accentuated or even disappear under the influence of heat. They also disappear as soon as removal of the motor trouble has allowed the circulation of the limb to return to normal.

Trophic disturbances of the skin, muscles, and bones, and of articular lesions are still of obscure origin and admit of many hypotheses. Here also, in his opinion, sufficient importance has not been given to the role played by immobilization in the abnormal conditions it imposes upon the vascular and thermic regulation systems of a limb deprived for months or even years of any kind of movement, and during which period it is sheltered both from light and air. The skin, nails, and hair undergo modification as soon as movement is recovered, and this factor alone proves to how great an extent immobilization must be considered responsible for other changes.

Mental condition. It seems to us that sufficient stress has not been laid in recent years on the great influence exerted by the mental condition in the genesis of psychoneurological affections. The soil in which hysterical disturbances have been cultivated should be carefully studied with a view to comprehension of the psychical state of the patient, his *moral*, his personal disposition,

as we consider that in a satisfactory mental condition lies the primary element of recovery from psychoneurological disturbances.

Reflex disturbances may be considered as phases of hysteria associated with secondary phenomena.

They develop in subjects giving evidence of :

A special psychic condition, previously existing or more often acquired or accentuated by the circumstances under which they are living. This psychic condition, which ranges from the mental state of the pithiatics to that of the victims of factory accidents and even to that of the claimants of legal rights (Brissaud's " sinistroses " or sufferers from misfortune), gives rise, on the occurrence of traumatism or some other factor, however slight or commonplace, to the appearance of motor disturbance of a hysterical nature: this may be voluntarily repeated and is equally liable to disappear suddenly if persuasion is brought to bear. Should such an influence be exerted on a limb whose circulation is perfectly normal, without incurable direct muscular lesions, this motor trouble may be the only symptom; it is a purely pithiatic disturbance. If, however, it develops in a previously existing abnormal circulatory field, acquired or accentuated by military life or by any other cause (arterial lesions due to the garrot, for instance) it may give rise to secondary phenomena. This defective circulation, doubtless connected with a disorganization of the sympathetic nervous system, consists in a vaso-constriction which is generally revealed by a bilateral diminution of the range of the arterial oscillations (microsphygmically).

On the ground thus prepared, immobilization or vicious habits in the use of the limb, due to the motor disturbance, then come into play, exaggerating the microsphygmia on the affected side (" amicroanisosphygmia ").

The latter gives rise to cyanosis and disturbances of the thermal system and their consequences, viz. deterioration in the mechanical and electrical contractility of the muscles, secretory and trophic changes, and alteration in the cutaneous reflexes.

Other factors (especially immobilization and the after-effects of infection) then begin to work on the ill-nourished limb, and create the lesions of the muscles and tendons which result in retractions, and the lesions of the bones and joints which cause fibrinous ankylosis.

Inactivity, insufficient nutrition, and sometimes a reflex reaction may bring about a muscular atrophy of the limb which, in its turn, affects the reflexes.

Conclusions and practical deductions.

Though we have considered it necessary to go very fully into the question of the pathological origin of reflex disturbances it has not been solely in response to the natural tendency to expose the results of our personal observations here; it is rather because a very useful practical lesson may be derived therefrom.

Whether or not one of the pathogenic theories described above be adopted (though such theories form only a part of the hypotheses which may be confirmed or disproved), an initial idea of considerable importance appears to issue more clearly before the Neurological Society than during the last two years. At first regarded doubtfully, and even rejected altogether by many doctors, the idea of Messrs. Babinski and Froment as to the possibility of successfully treating the physio-pathological syndrome through its chief element — the motor disturbance — is now accepted with almost complete unanimity.

Whether the reflex action, by persisting for a greater or lesser time after the disappearance of the original injury, exaggerate the vicious position of a limb or part of a limb into a contracture or paralysis (the theory of Babinski and Froment : whether the reflex action be only temporary and a psychic mechanism of fixation soon be substituted for it (the theory of Claude and Lhermitte); or whether the vicious attitude (paralysis or contracture) be from the beginning only the effect of a defensive movement or contraction in the presence of trauma, favored by emotion and fixed by suggestion, like all hystero-traumatic affections (the theory of Roussy, Boisseau and d'Oelsnitz), the psychic element dominates the clinical picture sooner or later. Whether this element be frequent and always secondary (the hysterical reflex association of Babinski and Froment); whether it be constant and primary (as is thought by Roussy, Boisseau, d'Oelsnitz, Claude and Lhermitte), there is no doubt as to the therapeutic procedures to be instituted and as to the necessity for all medical men to have recourse to psychotherapy.

The idea of curability merits a wide expansion, not only among neurologists, specialists and other doctors, but also among our wounded, who are, unfortunately, too much inclined to exaggerate the seriousness of their disability with an ulterior object.

It is towards this end that our personal efforts have been directed for more than a year.

Over and above the possibility of curing physiopathological affections, another and not less important idea becomes inevitable: it is admitted (as we already admit) that the physical disturbances, slight or serious (cyanosis, hypothermia, stiffness, and

ankylosis, tendon retractions, amyotrophia), are only secondary phenomena directly due to the motor trouble, and that they appear, in the great majority of cases, only at a very late stage. This idea is that more often than not such affections are avoidable if treated early enough, and if the contracture or paralysis is taken in hand as soon as it gives evidence of a tendency towards fixation.

Finally, we may say that real hysterical disturbances or hysterical disturbances associated with secondary lesions of an anatomical character, both belong to the classical school of traumatic hysteria and call for the same therapeutical treatment (psychotherapy or psycho-physiotherapy) and the same prophylactic measures.

Observations on the Diagnosis and Treatment of War Psycho-Neuroses Especially with Reference to Cases of Convulsions and Asthenia. Professor LAIGNEL-LAVASTINE, Chief of the psychoneurological Centre of the Paris Military Government, first discussed his general method of diagnosis.

1. Sufferers from war psychoneuroses are exceedingly complex patients, and it is therefore misleading to label them all with one name. Under these circumstances he has formed the habit of seeking systematically for four classes of symptoms :

(1) Physical signs of organic nervous disease;

(2) Physical signs of organic diseases, foreign to the nervous system but liable to react on it;

(3) Signs of psychical diseases;

(4) Illegitimate psychical manifestations.

The class of illegitimate manifestations includes : *allegation*, *utilization*, *perseveration*, *exaggeration*, *simulation*, *reclamation*.

The problem consists in the study of the innermost mental recesses of men broken in the war (their fear of returning to the front, their claims against the government in whose service they have fallen ill or been wounded, etc.). The subject must be caught redhanded in insincerity, for *de intentione homo non judicet*.

These four groups of disturbances, nervous, intrinsic, or referred, and psychic, legitimate or otherwise, are exclusively clinical in character and not founded on a pathological basis. Such grouping enables a clinical analysis of the patient to be made as simply as an analysis of a salt.

The next thing is the interpretation of each group, and the relation of each towards the others; thus the symptoms of the third group may easily result from the organic disease present in the first or second group.

2. *Application to cases of convulsions and asthenia.*

a) *Convulsions.* If one eliminates epilepsy and the hysterical crises of real insanity, the following are the principal types of convulsive phenomena:

(1) Attacks of strong emotion followed by periods of more or less dramatic anxiety.

(2) Attacks of hysteria resulting from the bursting of shells at close quarters and subsequent mental confusion; or from fainting fits arising from acute supra-renal insufficiency in conjunction with anti-typhoid vaccination.

(3) The hysterical attacks common to mental debility; and the attacks of toxic hysteria to which alcoholics are subject, with all the intermediate phases up to convulsive phases of drunkenness.

(4) The disingenuous persistence of originally legitimate hysteria, such as the anecdotal type of attack at the railway station at the time of departure of soldiers who have been on furlough and are going to rejoin their regiments at the front.

(5) The relapse, or rather resumption, on arrival, as soon as the subject has escaped neuro-psychiatric inspection.

(6) Finally the simulated attack.

If one applies to each individual case the general diagnostic scale, it will generally be easy to establish the evolutionary curve of the attacks and to place them pathogenically. It will thus be seen how some of them, by beginning physiologically, become secondarily psychogenetic. This is a course run very frequently by psychoneurotic patients. Their primary manifestations are nearly always the result of some organic trouble: they persist, become habitual, and then more and more stereotyped, though the original trouble may have completely disappeared.

b) *Asthenia.* The asthenic cases, whether predominantly psychic, nervous, or muscular, whether they appear to be an exaggerated constitutional condition or are consequent upon war injuries or some definite toxic infection, illustrate very well by the diversity of their pathogenesis the usefulness of our diagnostic scale, and at the same time lead one to the conclusion that nearly all the asthenic phenomena are organic or physiological in origin.

It is nevertheless certain that some are of psychic origin; worry, association with death, misfortune, and trouble generally, may bring about a state of asthenia by the strain on the nervous system. In these cases, however, the asthenia is the result of modifications of the internal secretions and body juices, as has been demonstrated so skilfully by certain writers among whom Major Crile is prominent.

To asthenic cases, therefore, besides the current methods, ana-

tomical and humoral, all the physiological methods of investigation (such as sphygmomanometry, digital plethysmography, vaso-motor inscriptions, measurement of the psychomotor reactions, tests for the galvano-psychic and oculo-cardiac reflexes, etc.), must be applied in order to be certain that some physiopathological factor is not allowed to pass in cases of flagrant untruth according to psychoscopic methods, *for insincerity in certain directions does not prove that there may not be disease in others.*

3. *Therapeutic Deductions.*

The idea of almost constant association of a physiopathological and insincere element in psycho-neurotics should dominate treatment.

If the preceding considerations are borne in mind the inefficient treatment which used to be so frequent will be guarded against: i.e. *too much physical and mechanical without psychical treatment*; tardy arrival at the neurological centers; the insufficient isolation of these centers and of the patients in them; hesitation and lack of firmness in applying treatment; interference of incompetent persons; insufficient discipline; too early dismissal on convalescence or for temporary discharge from the army; faulty coordination among the different medical services so that malingerers succeed in escaping from the examiner's net.

Psycho-neurotics must therefore be treated as follows:

As soon as possible and, as far as practicable, within the army zone;

By the application of psychic methods in all cases, assisted by various other therapeutic means utilizing mechanical, physical, chemical, and biological agents;

In an *isolation hospital*, far from towns, newspapers, family, and intrigues, where a strictly therapeutic isolation, similar to that practised in the sanatoria, can be maintained, and where the moral atmosphere necessary for cure and for facilitating a state of acquiescence, re-education, and training, will depend solely upon the physician, who will not have to struggle against obstacles placed in his path by a blundering military authority and where idleness, mother of sloth, of perseveration, and of complaints can be *the most effectively* overcome by active employment of a *kind* best calculated to induce moral and physical improvement in the re-educative workshops and agricultural schools near the neurologic center.

Once these primary conditions have been fulfilled, a firm, continuous and methodical medical authority must be added (the man undertaking this work must be capable of causing his moral author-

ity to stand clearly out over a very evident force of military discipline and a well established personal prestige. *When psycho-neurotic patients feel they are kept well in hand, they watch over their mental control.*

It is not sufficient, however, to cure the psycho-neurotics or at least to cause the disappearance of their abnormal manifestations; it is also necessary to prevent relapses as soon as the patients escape from the medical leading-strings in which they have been treated. It is for this reason that, following Henri Claude, since April 1915, he has used form letters which are sent separately to the military doctor on the return of psycho-neurotic patients to their corps.

Conclusions. The frequent association of organic and psychic phenomena in psycho-neurotic patients should lead to :

A systematic attempt to diagnose one of the four classes of trouble (nervous, intrinsic or referred, and psychic) and *a consistent combination of psychic treatment with other therapeutics.*

For all our sick and wounded are victims of the war, and with them as with those who have suffered from factory accidents *the psychological factor is always present*; and this perpetual psychological factor is still more important with the soldier than with the factory-hand, for it does not arise merely from cupidity and idleness but, above all, *from the instinct of self-preservation.*

Preventive Measures in Relation to War Neuroses in the U.S. Army Cantonments in America. Major John H. W. Rhein, M.R.C. The speaker said that by prophylactic measures in relation to War Neuroses he refers more especially to those which were and are being employed in the training camps in the United States with a view of preventing wastage in the Army with special references to ineffectives due to War Neuroses. Of these, the acute neuroses following causes, both commotional and emotional and other etiological factors form a large part. While these manifestations occur among men not predisposed to nervous break-downs before their entrance into the army, experience with the Allied Armies as well as our own army shows, and this statement will be generally accepted, that many of the cases exhibiting neuroses after exposure to front line experiences are psychoneurotics to begin with.

The recognition of this type of individual, that is, the psychoneurotic or the one predisposed to the development of neuroses, upon his admission to the cantonments and during his training period, and the prompt discharge from the Army, were believed to

be important measures tending to increase the safety, efficiency, and economy of military service in the A.E.F.

The object then of these preventive measures was to eliminate from the Army at an early date those who were nervously unstable, those who were actually suffering from neuroses, and those who appeared to be predisposed to nervous breakdowns. The function of these preventive measures included, however, also the elimination of those individuals which showed other evidences of nervous or mental disorders, organic or functional, within certain limits.

The examinations were made by members of boards, or by groups of neuropsychiatrists, who conducted surveys or who examined cases referred to them.

Upon admission to camps the medical examiners distributed among the camp infirmaries examined all the drafted Army, and a number of the men were recognized at the first examination as belonging to the group of cases which should be referred to the special neuro-psychiatric examiners. These cases were then first sent to the Special Board of Medical Examiners, who in turn referred them to that member of the board who was a neuro-psychiatrist, for examination and recommendations. Later this same board disposed of numbers of this type of cases which were referred for discharge on S.C.D. Surveys were also systematically made and these were intended to include the entire personnel: officers, enlisted men, members of classes, officers training corps, and applicants for enlistment, with a view to selecting cases for special examinations. To this end, consultations were made with regimental surgeons and company commanders as well as the making of personal observations by neuropsychiatrists of soldiers when they were collected together in groups for inspections of various sorts such as vaccinations, inoculations, heart, lung, orthopedics, or when grouped together for the special purpose of inspections by neurologists and psychiatrists. In addition to this, a neuro-psychiatrist visited the various organizations, observed the behavior of the men during drills, and at the same time consulted with medical officers, instructors, company commanders, and sergeants and selected in this way subjects for examination by boards or by the special neuropsychiatric examiner.

Medical officers, dental surgeons, instructors, hospital sergeants, barrack sergeants and Company Commanders were instructed to refer cases for examination by the neuro-psychiatrist who showed certain characteristics such as irritability, seclusiveness, sulkiness, depression, stupidity, personal uncleanliness, resentfulness under discipline, inability to be disciplined, sleep walking, nocturnal

eneuresis, or those who became the boobs, cranks, goats, and queer sticks of the company. Characteristics such as queerness, peculiarities, and idiosyncrasies which are often the early symptoms of mental diseases, were searched for.

Causes for rejection included organic nervous disease, unless the symptoms were no longer in operation and not likely to recur, or unless residual symptoms were present which did not interfere with a satisfactory performance of military duties; for example, paralysis of unimportant muscles after poliomyelitis or slight hypertonicity after infantile hemiplegia were not sufficient to reject. Hemiplegia after infancy always was a cause for rejection, as was also Existing neuritis.

Emphasis was laid on the importance of recognizing the early symptoms of tabes, multiple sclerosis, progressive muscular atrophies, dystrophies, syringomyelia, epilepsy and hyperthyroidism. Disorders of speech were searched for as possibly indicating the presence of paresis.

A corroborated history of a mental disease requiring hospital treatment or observation was a cause for rejection. All cases showing symptoms of psychoses, of course, were rejected flatly. Men who were mental defectives or who suffered from psychoneuroses, or who were of a psychopathic character, and chronic inebriates and drug addicts were rejected.

In searching for mental defectives, the experience was novel. Many cases were referred for mental deficiency who were really not actually morons or imbeciles. They were illiterate, inexperienced, undeveloped, and had little or no schooling, due to the fact that they lived too long a distance from schools to be able to attend regularly, and also to the necessity of going to work at an early age on account of the economic conditions of the family, and a good many of them were below the average intelligence. They were examples of mental deficiency by deprivation. This class of men exhibited, after coming to camp, a slowing up of their mental processes, for obvious reasons. They received a multitude of new stimuli at once upon reaching camp, which was a new and unusual environment, in which many varied experiences crowded in on them at high speed, and they did not assimilate these readily at the start off. The result was that the individuals presented the appearances at first of mental retardation. Investigation of their social and industrial histories revealed, however, the fact that they had been able to get along moderately successfully in their home atmosphere, had saved money, owned their own places, were married and conducted their business successfully and we concluded that

such cases were probably not mental defectives but that after a time they could develop into fairly good soldiers. These men were returned to their companies and in most instances the results were satisfactory.

It is not to be expected as a result of these examinations that the eliminating of all cases of nervous and mental disease will have been accomplished, but it is hoped that the number of casualties due to disturbances of the nervous system will be materially lessened. It would be too much to expect, however, that this number will be neglible.

The number of nervous and mental diseases reported up to February, 1918, is 13,481 from National Army and National Guard cantonments and the recruit depots. Of this number the diagnosis of mental deficiency was made in 35 o/o. There were over 12 o/o who were epileptics and over 11 o/o who were psychoneurotics. The diagnosis of constitutional psychopathic states was made in 9 o/o, and in 6 o/o the diagnosis of dementia praecox was made. Manic depressive insanity occurred in about 2 o/o of the cases and paresis in about 1 o/o of the cases. The remainder were made up of alcoholics, drug addicts, men suffering from organic nervous diseases and other psychoses than those mentioned. If we acknowledge that psychoneurotics and those showing constitutional psychopathic states are the most fruitful source of the cases of the war neuroses, we may expect that the elimination of these will have a definite result in lowering the number of such cases. It would be difficult to give an exact percentage of the whole number of drafted men examined who were rejected for nervous and mental disease, but roughly this may be estimated at 1.5 o/o, admitted to camps.

There were among the cases examined a group presenting symptoms referable to the nervous system which could be classified as exaggerations or malingers. These presented symptoms which have been observed and reported as occurring in the allied armies and in our own army in considerable numbers, as the result of trench warfare. The elimination of many of these cases no doubt also will lower the number of the cases of this type which we may expect to see and which were so frequent in the English and at first, at least, in the French armies.

In his experience in Camp Travis where about 40,000 men were examined or surveyed and where, as a member of the special board of medical examiners, the speaker saw all the cases of malingering; the most common type consisted of those whose complaints were exaggerations, or perseveration of symptoms which originated in

a more or less severe injury some months or years previously, which gave rise to habitual attitude or limps similar to those described as occurring in the cases of war neuroses and now described by Babinski as reflex disorders or physiopathic disorders.

The limps were of very common occurrence. Some walked on the outside of the foot, due to a contraction of the anterior tibial muscle; or on the inside of the foot due to contraction of the extensors; or on the toes, a flexor contracture; or some walked with bent knee with a list to the same side.

Fake sciatic cases were frequent, as were also contractures of the trapezius muscle, the sterno-cleido-mastoid or all of the posterior group of neck muscles. The bent back, the camptocornia or plicature of the French was occasionally observed, also contractures of the arm, hand, and wrist. In fact, an observation which he was able to make as a result of his studies in Camp Travis, in the French hospitals, and in the British Shell Shock hospitals, as well as among our own soldiers subjected to shell fire, is that many of the nervous manifestations are presented by the drafted men in training camps, though in a minor degree, as is observed in the soldier on the firing line who has been under shell fire and who presents disorders referable to the nervous system. In other words, the war neuroses — or if you please shell shock phenomena — observed among the French and English soldiers and seen in the American Forces correspond to those nervous phenomena seen in training camps among drafted men upon their admission to camp or after they have been under training a short time, except, perhaps, in the latter case not to such an extreme degree.

Discussion :

Dr. Tom A. Williams said that there are two chief clinical ways in which psychological disturbances have shown themselves during the present war. The first is motor impotence. In most of these cases there has been a wound; often, however, only slight; but the patient does not recover utility when the wound gets well. The second is a general nervousness without lesion, usually stated by the patient to be the result of what he calls " shell-shock ".

In both of these conditions, the first duty of the neurologist is to make sure that physical disturbances are not responsible for any part of the condition. In peripheral disorders, when he has discovered the integrity of the muscles by their electric reactions and has shown by warming the limb that the circulation is intact; and when he has established the freedom of the articulations from adhesions, he is then well in a position to affirm that the patient's dis-

ability is purely psychic; and that it is completely removable by the methods he knows how to apply.

In the so-called " shell-shock " cases, the neurologist will make sure that there is no alteration of the cerebro-spinal fluid, that the vasomotor system has not been put out of gear, that the reactional movements provoked by labyrinthine stimulus are normal, and, after doing so, he will be prepared to enter into the psychogenetic factors of the patient's illness and to deal with the patient by methods not dissimilar in principle to those applied to the cases of peripheral incapacity.

The clinician must remember the great difference of resistance in patients. Their threshold to stimuli varies as regards :

1. The bearing of pain, every surgeon knowing how some patients will withstand the most painful dressings, while others writhe in agony. This is not only dependent upon psychological fortitude, but upon the physical state of the organism. After loss of blood, starvation, during suppuration and shock, resistance is greatly lowered. Some persons again seem to be constitutionally less susceptible to pain.

2. The threshold to emotive disturbances is most variable.

3. The most variable of all factors, however, is that of suggestibility. Most persons, however, are extremely suggestible.

It is upon the ductility of humanity that the neurologist depends for his success in returning psychoneurotics to service. For the same facility with which the man becomes a psychoneurotic favors his return to normal. However, the measures used must be properly designed and skilfully carried out, and, if so, one or two sittings suffice for cure, which is really easy.

Very unequal have been the results obtained by different psychiatrists and in different countries. Zeal and wholeheartedness are indispensable qualifications, but they are inadequate unless based upon correct diagnoses and utilized in conformity with the actual mechanism of the patient's disorders. Again the psychotherapeutist must not only himself be skilful, but must provide an atmosphere in the hospital which bears upon the reeducation of the men which he seeks to effect.

This is most easily provided in the Army Zone, and under strict military discipline; for in this situation the dangers of contrary influences are minimized. In the Army Zone, a doctor has all the prestige of an officer of the army, disobedience to whose orders is a serious infraction of military discipline and bears all the consequences of such a procedure.

Thus there are various methods of obtaining the effect to be

aimed at, namely, the impression of the patient by the certainty that he can be cured. Of course, in spite of all methods, this suggestion often fails, and then the work must be done entirely by the doctor himself. This consists in a proper analysis of the mechanism of the morbid affective state.

The whole treatment is likely to be taken exception to by the friends of patients, by self-seeking demagogues, or by misled philanthropists. Thus the methods that are required must have the support of public opinion. This, of course, depends upon medical opinion, which is dependent upon neurological doctrines regarding the mechanism of the psychoneuroses.

Lieut.-Colonel Gordon Holmes, R. A. M. C., dealt briefly with the treatment and management of the psyschoneuroses as they appear in combatant Armies, rather than with their clinical symptoms and nature, as success is most certainly assured when adequate clinical methods can be rationally employed under suitable conditions.

The importance of this subject lies not only in the serious wastage to the combatant forces that may accrue if successful steps are not taken to check the development of neurotic states and to relieve as quickly as possible the functional and nervous symptoms which appear, but it is also a matter of great social importance too, because, if the cases are not treated successfully, they are liable, when returned to civil life, to degenerate into social parasites and become a moral incubus as well as a financial burden on their country. The latest statement made in the British Parliament revealed the fact told that 6 o/o of those pensioned, or over 20,000 men, have been invalided from British armies with " shell shock ", and common experience under the Compensation Act makes it probable that a large proportion of these will remain civil pensioners and unproductive units to the State. The great majority of these men were certainly evacuated from the army before it was recognized that early and vigorous treatment under rigid military discipline is essential, and that the proportion of recoveries is very much smaller when active therapeutics is delayed.

It was not till the winter of 1916 that our present system was brought into operation by the present Director General. The French had already recognized that the first essential step was to establish neurological centers within the army areas, as near the front as was compatible with safety and suitable conditions, where the men could come under treatment before their symptoms

became fixed and organized, and could remain under the control of the armies to which they belonged. Similar centers are established in each British army; into these all the cases evacuated from the medical units are transferred as early as possible. The accommodation of each center must vary with the number of troops within the army area and the severity and nature of the operations in which the army may be engaged, but should be sufficiently large to assure that all who may recover within a reasonable time can be returned directly from them to their units. This is always desirable as there is a considerable danger of the recurrence or remission of symptoms when such patients are transferred through a series of hospitals, convalescent camps, and base dépôts, and come under the care of officers who may not be fully acquainted with their previous conditions.

As a certain proportion of the patients must be eventually evacuated there should also be centers or specially organized divisions in the base hospitals on the lines of communication to receive them. These cases comprise men with severe symptoms, chiefly those with an unstable emotional basis, and patients who have already been treated for some manifestation of the psychoneuroses and have broken down again after a relatively short period under fire. Many of these eventually recover and become again fit for service, and most of the others can usefully be employed in base work. The percentage that under this system must be evacuated to England, or be permanently lost to the Army, is consequently very small.

Success in the treatment of these cases depends chiefly on the organization of the army neurological centers. No elaborate hospital accommodation is needed — some of the most satisfactory work has been carried out under canvas. As strict isolation is necessary in a small proportion of cases, especially in those with tremors and irregular tic-like movements, a certain number of small isolation cubicles should be provided, and there should be, of course, quiet examination and treatment rooms where each man can be examined and dealt with alone. Provided the centre is properly managed and the medical staff is efficient and creates the proper atmosphere, these functional cases recover much more quickly and certainly when concentrated in such centers than when they are scattered among the sick and wounded.

The staff of each Center should include at least one competent neurologist, or at least a medical officer with sufficient training and experience in nervous diseases to diagnose and recognize with certainty the various neuropathic conditions that he may meet. As

Major Kennedy said, everyone recognizes that the primary essential in treating functional nervous disorders is self-confidence on the part of the medical officer, for unless he is a mere charlatan a doctor cannot inspire the patients with confidence if he is uncertain whether they are suffering from functional or organic conditions. It must not be forgotten that men suffering with injuries of the head and spinal cord as well as others suffering with tabes, general paralysis, disseminated sclerosis, and other organic conditions, will frequently be admitted to your neurological centers.

Colonel Salmon mentioned in his address that the American Expeditionary Force proposes to place a psychiatrist in each divisional hospital, who should select the cases suitable for transfer to the neurological centers. The speaker felt that this was a mistake, as every psychiatrist does not possess the training and skill needed to diagnose nervous diseases and to enable him to select with certainty the cases that require special treatment. These psychoneuroses differ in no way from those that we are accustomed to meet in civil life, and these come into the hands of the neurologist for treatment rather than into the institutions to which the work of most psychiatrists is limited. The services of one psychiatrist in each center is, however, advisable, as a certain number of men with early mental disturbances are frequently admitted, and a psychiatrist can undertake the care of the exhaustion psychoses and certain purely emotional conditions which frequently develop after periods of severe fighting.

There should be also in each center arrangements for physical training, organized games, and modified drill by which the men who recover can be gradually hardened up for active service and their physical health and morale improved,

It was unnecessary, the speaker believed, to deal with the methods of treatment that have been adopted in the army centers. They are identical with those that have been found so successful by our French allies. They were referred to by previous speakers. In a word, the British rely upon suggestion and persuasion, and the careful sorting out of men who are unfit owing to physical and mental defects.

As to the nature of the cases which should be admitted to the Army neurological centres, the speaker said that the psychoneuroses may be roughly divided into hysteria, neurasthenia, — especially traumatic neurasthenia, — and such cases as fall into Dupré's emotional syndrome. We find, however, that a certain number of men who do not suffer from any of these conditions are frequently sent down for admission. Practically all combatant

units contain men who are regarded by their officers as unfit for active soldiering or undesirable, and the easiest method of getting rid of them is on medical grounds. They should be, however, rigidly excluded from the neurological centers as they may have a bad moral effect on men suffering with genuine psychoneuroses and taint that healthy atmosphere which is one of the greatest assets in treating functional conditions.

Still more serious is the frequent error made in sending to the neurological centers men suffering from slight concussion only, due to being blown over by the bursting of a shell or being buried in a blown-in trench or dug-out. Many of these cases are certainly abnormally emotional and present symptoms we ordinarily see after concussion, but if they are given rest or light duty in the transport lines, or in the regimental aid post under the medical officer's direct supervision they are generally fit to return to duty within a few days. If, however, they are admitted among men with severe neurotic manifestations, it frequently happens that they develop by subconscious mimicry symptoms similar to those of the patients around them; for most men who have been subjected to a severe emotional strain become for a time abnormally suggestible and are consequently liable to develop any symptoms which are suggested to them by their surroundings. The speaker considered this one of the most important points to be emphasized, for his experience had been that when new and inexperienced officers are attached to divisions, the number of such unsuitable cases transferred to centers increases, and there is consequently a danger that the centers may do positive harm as well as render valuable service.

Professor Pierre Marie said that after hearing the very interesting reports which had been made, he had the impression that a certain number of our British and American colleagues had a very set idea on the subjet of commotion. They seemed to believe that unless there is a mark or injury on some part of the body, and especially the skull, the patient can be considered, if not a malingerer, at least a bad soldier, who is not loyally fulfilling his duty towards his country.

The French neurologists came to the same conclusion in the latter part of the first year of the war.

When, however, more cases had been seen the neurologists had to change their first ideas and no longer considered all cases of commotion as neuropaths or malingerers. The speaker was convinced that without any local lesions commotion might be caused by organic alterations of the nervous centers which can be obser-

ved by means now at hand, and especially, from a clinical point of view, lumbar puncture. Sometimes the cerebro-spinal liquid contains blood. In such cases it is evident that there is no gross lesion of the nervous centers. Sometimes it is simply xanthochromic, but the signification is the same. In the greater number of true commotion its aspect is normal, but shows a modified formula the clinical meaning of which is very important. This formula means that:

1. The quantity of albumen in the cerebro-spinal liquid has increased; from 0.25 gram. to 1 gram. instead of from 0 15 to 0.25.

2. The number of the cells is smaller, from 0.3 to 0.7., instead of from 1 to 2.

3. There is a slight tendency to hyperglucosis in a considerable number of cases. One must also take into consideration the more or less prolonged loss of consciousness which nearly always marks the beginning of the state of commotion. One will also frequently see labyrinthine troubles, and sometimes even gross lesions of the tympanum. All these objective signs can be explained only by admitting the existence of alterations of the nervous centers.

Mr. Lesene was right when he said that a commotion could be considered as a diffuse micro-traumatism, meaning that the traumatism involved only the microscopical elements. At the end of four or six weeks the formula of the cerebro-spinal liquid becomes practically normal again.

The cause of the state of commotion may be a change of pressure, but more probably the sudden shock, such as the displacement of air due to an explosion. The speaker in conclusion, expressed the conviction that although it is a good thing to punish malingerers and fakers, it would be a great injustice to overlook cases of organic commotion in which the patients are really wounded, even if their wounds are merely micro-traumatic.

ABSTRACTS

SURGERY

Interallied Surgical Conference, 4th Session, *La Presse Médicale,* April 11, 1918.

The Interallied Surgical Conference for the Study of War

Wounds held its meeting at the Val-de-Grâce, March 11-16. The seven following questions were discussed :

1. *Blood Transfusion.* Indication and technique;

2. Diagnosis, physiology, pathology and treatment of trench foot (frozen feet);

3. Treatment of wounds of the pelvis (especially rectum and bladder);

4. Pseudarthrosis consecutive to war wounds;

5. Conservative operations in the treatment of foot injuries by war projectiles;

6. Osteosynthesis in the treatment of war fractures;

7. Analysis of methods of wound sterilization.

After having heard and discussed the reports presented on these different questions, the Conference adopted the following conclusions :

I. *Conclusions on Blood Transfusion.*

Blood transfusion gives results sufficiently definite to be considered the method of choice in the treatment of severe hemorrhages.

I. *Indications.* a) *During the first hours after the wound :* Indications are observed by means of clinical study. They can be shown more clearly by frequent taking of blood pressure and by counting the number of the red blood corpuscles, which give indications in wounds of the limbs.

In the advanced posts and when circumstances make such examinations impossible, the indications will be furnished solely by the *clinical symptoms.*

In cases of circulatory collapse resulting from a superacute affection (gas gangrene), transfusion has not given favorable results.

In shock, the indications for transfusion are not sufficiently definite.

b) *During treatment.* Post-hemorrhagic globular anemia is not usually serious. It does not justifiy transfusion, if the general condition of the patient is satisfactory.

II. *Preliminary Precautions.* a) It is useless to examine and classify the donors to avoid transmission of diseases such as syphilis and malaria.

b) Fatal accidents have been observed in cases where the globules of the donor were agglutinated by the patient's plasma. These accidents are very unusual. They can surely be avoided by a very easy agglutination test. It is therefore absolutely indispensable to

look for agglutination in all cases, as far as possible, and to classify the givers accordingly.

In war work, transfusion may be made in advanced posts and in the H. O. E. (*Field Hospitals*) In the latter, all these precautions must be taken. In the advanced posts, transfusion can be done, even if it is impossible to make the agglutination test, since the danger is relatively small.

c) Transfusion must not be undertaken except with an apparatus in perfect condition and one which can be thoroughly sterilized.

III. *Technic.* The method must correspond to the quantity of blood transfused. Gratifying experiments have been made in the use of blood preserved during many days. This method will be of great benefit, especially in advanced posts during intensive military activity.

The *indirect* methods of transfusion of fresh blood are more easily employed than the vasculary anastomosis; *citrated* blood is used in the former, aspiration of pure blood in paraffined ampoules or in syringes in the latter. The three methods have given good results.

As a rule, transfusion must be made as soon as possible after the injury. Nevertheless, it cannot be performed before the hemorrhage has stopped. In hemorrhages of the chest or abdomen, or in wounds of limbs, transfusion should be performed before or during the operation, according to the patient's condition.

II. *Conclusions on Trench Feet.*

I. Trench foot is a pathologic condition caused by damp cold, often complicated by secondary infection.

2. Its evolution has the four following periods (Raymond).

1. Period of painful anesthesia;
2. Edema;
3. Blisters;
4. Scabs.

Three clinical forms can be described.

a) A mild form (85 to 90 o/o of cases) marked by painful anesthesia, edema and redness;

b) A fairly severe form (13 to 14 o/o of cases) marked by blisters and limited scabs;

c) A severe form (1 o/o of cases on the average) marked by an increase of gangrenous phenomena and the appearance of septic accidents. This form mutilates severely and causes death.

3. Trench foot, especially in the severe forms, is very often complicated with tetanus and gas gangrene. It is also liable to relapse

and recur. Trench foot occurs nearly exclusively on soldiers staying in trenches, particularly in certain trenches. Soldiers from warm countries, the negroes especially, are more often victims than the Europeans. In Italy, the soldiers from the South have suffered more than those from the North. Adolescence, hyperhydrosis, and a previous attack are predisposing causes.

4. Blood stasis caused by standing for a long time, long immobility and defective position (half kneeling), compression of the leg and poor venous circulation, as produced by spiral puttees, and especially a long stay in cold dampness (muddy, flooded trenches, shell holes), constitute the principle causes of trench feet.

6. Trench foot can be confused with chilblain and frozen foot. Congelation is marked by early massive mortification of part of a limb (fore foot, entire foot, etc.); the trench foot, on the contrary, by a limited destruction (sphacelous patches on the dorsum, sole, and toes progressively extending to other tissues of the foot). The first condition is observed in intense dry colds, especially in the mountains; the second is produced only by damp weather, at low altitudes (valleys, plains). The trench foot disappears when it freezes.

Chilblains are characterized, at the beginning at least, by severe itching, whereas trench foot, in its light forms, is marked by a painful anesthesia without any itching. Diagnosis between ulcerated chilblains and the ulcerated phlyctenas of trench foot, may often be difficult.

6. The treatment of trench foot is preventive and curative. The preventive treatment, energetically applied and supervised, prevents the occurrence of trench foot, or at least makes it very unusual. It includes :

a) Collective individual measures (cleaning, greasing, and massage of the feet; change of socks in the shelter; proper adjustment of the spiral puttees and of all that can produce compression of the leg). Our Belgian confreres ascribe the extremely low incidence of trench foot in their army to the suppression of spiral puttees.

Curative Treatment.

a) *Slight Forms.* Every second or third day, lukewarm foot bath and use of borated-camphorated soap; daily dressing of the foot with a moist borated-camphorated dressing.

b) *Severe Forms.* If only blisters are present, they should be opened and camphorated ether, with a moist borated-camphorated dressing, applied. If scabs are present continue the same treat-

ment patiently. Scabs must not be taken off surgically but just scarified, without bleeding, so that the modifying agents can act on the underlying tissues. Wait for spontaneous elimination, carefully watch complications and treat them surgically and open widely from the beginning. The operation must, as a rule, be deferred.

In every case, this treatment must be supplemented by a preventive antitetanic treatment injection of antitetanic serum every eight days, until healing of the wounds).

III. *Conclusions on Wounds of the Pelvis, Especially of the Rectum and Bladder.*

I. *Simple Wounds of the Pelvis.* Treatment depends on the general therapeutics of war wounds of the soft parts or bones. Comminutive fractures of the ilium, particularly, require wide trephining.

The extraction of projectiles (splinters are often driven in the psoas iliacus) is very difficult and must be done systematically.

II. *Wounds of the Bladder* : (a) *Intraperitoneal* : Justifiy a laparotomy and suture; b) *Extra-peritoneal* : Super-pubic wounds can be treated by primitive vesical suture.

The wounds of the walls and base of the bladder, which cannot be reached by operation do not require an immediate systematic cystostomy. The surgical treatment of the entrance wound and of its direction insure sufficient drainage.

III. *Wounds of the Rectum* : (a) *Intraperitoneal* : Like all intestinal wounds, these justify laparotomy with suture. b, *Extra peritoneal* : In the majority of cases treatment consist in the flattening of the wound, followed by plugging of the rectal wound.

Constipation of the patient is an indispensable adjuvant.

In splintering with extensive separation, the fixing of the rectum, completed if necessary by a posterior rectotomy, will be the treatment of choice. Primitive colostomy has very exceptional indications.

IV. *Associated Wounds of the Bladder and Rectum.* The majority of these heal up after the surgical treatment of the extravesical direction of the projectile. Colostomy should be reserved for very large vesicorectal openings.

Primitive cystotomy is very often useless. The retention sound, ventral decubitus, micturition in the genu pectoral position favor spontaneous healing of the vesicorectal fistula.

IV. *Conclusions on Treatment of Pseudarthroses* :

I. The inevitable primary cause of pseudarthroses is the *primitive* destruction of a part of the diaphysis. The other actual causes — infection, careless extraction of splinters (esquillectomy) and bad reductions should be avoided.

A certain number of pseudarthroses may be prevented by sterilizing the focus of the fracture, conservative esquillectomy, good reduction, carefully watched, and, in some well defined cases, immediate or early osteosynthesis.

II. Except in exceptional cases, pseudarthroses must be operated on *late*, when the skin wound has completely healed and when clinically the inflammatory reaction is over.

The late and lesser inflammations must be detected by such methods as active and passive movements, elastic bands, and intensive massage.

III. From a therapeutic standpoint two cases must be recognized.

(a) In the simple pseudarthroses and in certain others associated with loss of substance in segments of limbs having only one bone, after refreshing the edges of the bones according to pathological anatomy, metallic osteosynthesis can be performed. The best method appears to be the fixation by metallic plate with screws — the screws being driven as far as possible from the center of the pseudarthroses.

The combination of the metallic prothesis and of the osteoperiostic graft has given very good results.

(b) A pseudarthrosis with loss of bone substance necessitates in most cases the bone or osteoperiostic graft.

IV. A perfect asepsis and a complete excision of the fibrous tissue surrounding the fragments and of certain diseased bone portions are the indispensable conditions of success.

V. *Conclusions on the Results of Conservative Operations in Wounds of the Foot by War Projectiles.*

Since the integrity of the sole of the foot is very desirable, only the strictly necessary incisions and resections should be performed in that region. Healing by first intention must be looked for in every case. The same thing must be looked for on the dorsum of the foot when the cicatrix retraction might hamper the movements of the sole of the foot. It is even permissible to resect certain bones so as to favor the primitive and secondary reunion of the wound and the normal position of the plantar teguments.

The amputation of one or many toes causes little difficulty of movement. The conservation of a single toe, especially the first or the fifth, is very often embarrassing.

The disarticulation of the metatarsals with conservation of the corresponding toes generally gives unfavorable results.

The resection of the first and fifth toes with their metatarsals also gives defective results.

When the three metatarsals, II, III, IV, have been resected, they give to the foot a pointed form which seriously impedes walking and standing.

Generally, the disappearance of three metatarsals hampers greatly the statics of the foot.

The transmetatarsal amputation, with a good plantar flap, gives a very favorable result, whether made at the anterior or at the farthest posterior part of the metatarsus.

Following Lisfranc's disarticulation, walking is easy and even flexible, if the rest of the foot is in good condition. This difficult operation can be simplified by leaving the metatarsal cases in the wound. The pre-scaphoido-cuboidian amputation produces good functional results.

Summing up, all the operations on the anterior tarsus give favorable results if there is no complication due to the scar or to the condition of the overlying articulations.

Chopart's amputation, when performed under good conditions and well attented to, can give a good result; but equinismus and the prolapse of the stump often cause functional troubles which make it *inferior* to Lisfranc's and Syme's operations. Partial astragalo-calcanean or horizontal resections of the calcaneum prevent a tendency to equinism.

The sub-astragalian amputation, Pirogoff's amputation, and especially Syme's, allow easy and quick walking.

Operations on the posterior tarsus are, on the contrary, very often followed by functional troubles. Total or sub-total astragalostomy gives good results, but they are less favorable than in peace time; infections, articular, and tendinous stiffness, inadequate after-care of the foot position, are the causes of this deficiency.

The total, or nearly total, ablation of the calcaneum, if not followed by bone regeneration, produces serious troubles, with very frequent tibia-tarsian or mediotarsian ankylosis.

Partial resections, posterior or inferior, give less favorable results if the foot is kept at right angles for the total duration of treatment.

Associated resection of the calcaneum and the astragalum gives generally bad results.

Atypical Operations. The resections of the anterior tarsus, scaphoid, cuboid, are often accompanied by equinism with valgus or varus or falling of the arch. An orthopedic shoe greatly helps movements. The ablation of either of these two bones seems to be equally serious.

The results of atypical operations on many bones of the anterior tarsus depend on the state of conservation of the arch of the foot, on the value of the plantar supports, and on the movements of the articulations and tendons, much more than on the localization of the operation itself.

The faulty attitudes of the foot, with free articulations, can be cured or ameliorated by sections or by tendinous transplantations. Transplantations will be particularly useful when certain tendons have disappeared.

Certain faulty attitudes with ankylosis necessitate secondary operations on the skeleton (cuneiform resection, astragalectomy).

As a rule, conservative operations on the metatarsus give excellent results; but on the posterior tarsus, ablations of the calcaneum or the combined resection of many bones, often cause more severe functional troubles than those resulting from disarticulation or Syme's operation.

Notation. Professor Depage notes that in articular suppuration of the tarsus long persisting, even after astragalectomy, the anterior and inward inversion of the foot by large sections of tendons and ligaments if kept bandaged in this position, favors the disinfection of the focus. The foot can be restored to its normal position after 8 or 15 days.

VI. *Conclusions on Osteosynthesis in War Fractures.* (Pseudarthroses excepted).

We must consider the primitive osteosynthesis, and the osteosynthesis during the infection period of the fracture.

Primitive Osteosynthesis. The possibility of applying to a great number of wounds, complicated with fractures the primitive immediate or deferred suture, justifies the practice of immediate osteosynthesis.

The indications of this osteosynthesis are few.

1. Certain articular fractures in which osteosynthesis appears to be the method of choice for the return to the anatomical and functional state.

2. The irreducible diaphysis fractures, or those impossible of maintaining correct reduction specially sub-condylar fractures of the femur, fractures of the fore-arm, etc. and the presence of large splinters off their axis.

However, the perfection of modern apparatus allows, in most cases, a satisfactory correction without osteosynthesis.

Primitive osteosynthesis is a difficult operation which can bring about serious complications. It must be performed only by specialists, and its indications are few. In the British Army, primitive osteosynthesis is very seldom performed, and this for two reasons: 1st, the good results of modern apparatus; 2nd, the bad results of osteosynthesis in the past.

Osteosynthesis During the Infection Period. Osteosynthesis during the infection period is accepted by some, but formally rejected by others.

The former say that it lessens the infection of the fracture focus, is not accompanied by osteomyelitis of long duration, and very seldom is the cause of secondary sequestra.

As a whole, the results are favorable.

The indications are the impossibility of reduction, or keeping correctly reduced some diaphyseal fracture of the limbs.

However, the perfection of modern apparatus gives such satisfactory reductions that osteosynthesis is very seldom indicated.

The majority is in favor of the temporary osteosynthesis by the screwed plate.

VII. (This Section Was Not Summarized.)

The Restoration and Repair of Wounds, Combating Contamination and Infection. Lt-Colonel GEORGE W. CRILE, M. R. C., U. S. A., *Surgery, Gynecology, and Obstetrics*, April, 1918.

The depressed resistance of a contused wound may be most quickly raised by immediate excision of its partially devitalized tissue.

Next in importance, is the application of the great physiologic principle: physiologic rest. It includes more than mere muscular and psychic rest: it implies equally cellular rest. To secure physiologic rest in the case of a fracture, an even, adequate, continous extension must be made. Physiologic rest of the soft parts means quiet produced by means of support. For open wounds it means

that antiseptics must not be damaging. It implies no transport, no painful dressings, no alarms.

In the destruction of contaminating bacteria, the first and most dependable agency is the bactericidal power of tissues. This normal defence of tissue against bacteria is present only in living tissues; and the ability of living tissue to overcome infection depends on its vitality. If the defense line is broken at one point, the entire line may give way.

As for antiseptics: the best results are the sum of good surgery and the good use of good chemical antiseptics.

If it is a military necessity that a patient be rushed down the lines of communication and if the attention of the surgeon is focused away from the principles of surgery and only toward the antiseptic — to the degree that good surgery is out of reach of both the patient and the surgeon — to that extent must antiseptics be depended upon.

An open, fairly superficial wound without inaccessible areas does admirably with normal saline, Carrel-Dakin, " b. i. p. ", eusol or electric light — perhaps best of all by the last named. A wound with deep injury areas will do well treated by the Carrel-Dakin method or " b. i. p. ". In a great rush " b. i. p. " is indicated.

In the stage of infection, the treatment consists chiefly in physiologic rest in the broadest sense; and, in addition, if there is sufficient pain, redness and swelling to indicate the actual presence of an invading infection, many and free incisions should be made into the area of infection — throughout the area of infection — until redness and the damaging tension disappears.

If conditions permit, the best single treatment undoubtedly is hot packs; in time of stress " b. i. p. "; in deep wounds, dependent drainage; in quiet times, Carrel-Dakin. When the wounded come in waves, and surgeons and nurses are swamped, incision and " b. i. p. " give the best results to the greatest number per surgeon. But " b. i. p. " must be spread thinly, not applied in masses and the wound should not be sutured but should be lightly packed.

In the granulation and healing stage we have to deal with: (a) contaminated wounds that have become relatively sterile and may be closed; (b) infected wounds that have become relatively sterile and may be closed; (c) wounds with too much loss of tissue; (d) wounds too deep and too extensive for closure.

The closed wounds require no further discussion. The deep wounds, such as compound fractures, present one fundamental problem, viz. the prevention of the pocketing of pus.

The ideal method by which to secure superficial healing is by

immediately covering the surface by skin graft; otherwise, hot packs of eusol or normal saline, alternating with electric light, or sunlight give the best results.

Meaning of physiologic rest. Physiologic rest implies no irritating dressings, comfortable position, no compressing bandages, no painful handling, even and balanced muscular pull, no accumulation of wound discharge, apparatus that will permit necessary moving about in bed without breaking physiologic rest.

Skin Grafting. By J. C. Masson, Rochester, Minn. *Journal of the American Medical Association*, vol. LXX, June 1, 1918, p. 158.

Masson emphasizes the fact that many wounds primarily infected are under modern methods made rapidly sterile and may then be closed like any fresh wound. But where there has been much skin destruction, ordinary plastic methods will not suffice, and skin grafting must be resorted to. While skin grafting was practised in ancient times it was not until 1869 following the reading of a paper by Reverdin in Paris that it was accepted as a regular surgical procedure.

Masson refers to the three types of grafts: (1) Reverdin consisting of small islets of skin, mostly epidermis but containing some dermis in the center; (2) Thiersch, consisting of sheets of skin as thin as possible, and consisting chiefly of epidermis; (3) Wolfe graft, consisting of entire thickness of skin (the most satisfactory when successfully used). There are three sources from which a graft may be obtained: (1) the patient — autoplastic grafts; (2) another person — isoplastic grafts; (3) from one of the lower animals — zooplastic grafts. Autografts are best, but Masson believes that isografts have a larger field of usefulness than is generally believed. He has used them with almost as much success as autografts, but insists that the blood of donor and recipient should be tested for agglutination, and that a donor for skin grafting should be selected in the same manner as a donor for blood transfusion; which means that besides the agglutination test, a Wasserman test should also be done.

For satisfactory skin grafting a wound should be as nearly sterile as possible, and granulation should be healthy. If not, means should be taken to improve their condition, either by curetting or excision of ulcer, or the use of various solutions, such as Dichloramin-T, or Dakin's solution.

As to the kind of graft to be used, the Wolf graft is the best, but

is not so likely to take as the others. However, where possible, especially around joints, or where dealing with extensive areas, recourse should be had at least in part to grafts of the entire thickness of skin.

As to the part of the body from which to take the graft, the type of skin desired should be considered. Ordinarily the outer and anterior surface of thigh or upper arm will prove most satisfactory.

General or local anesthesia may be used. Masson finds the iodin method of skin preparation as satisfactory as any. He uses 1 : 1000 iodin in benzin, and after this dries, applies two coats of a 3.5 per cent iodin in alcohol. His method of obtaining grafts varies somewhat from the usual. He first obtains a Thiersch graft by the usual method; then, if the skin is thick, a second layer may be removed from the same area in the same way, or small island grafts may be taken from the center of the raw surface to include some of the deeper layers of epidermis and some of the superficial layers of dermis. He then reduces the size of the wound from which the grafts have been taken by excising an elliptical area of subcutaneous tissue and bringing the edges together with sutures This removed tissue may also be used if necessary by cutting it into small sectional grafts (a term used by Colebrook and Fleming) and applying it just as the ordinary Reverdin grafts are applied. By this method twice the amount of grafting material is obtained from a given area, and the suture wound heals by primary union which is an advantage over the raw area left after the removal of Thiersch and Reverdin grafts. If the wound is completely covered with Thiersch grafts, the open method is best, with the occasional removal of crusts and the application by atomizer of Dichloramin-T (4 per cent) or Dakin's solution. If the wound is only partially covered by grafts, he uses paraffin gauze over which is applied a wet dressing changed every four hours for three days. For the next three or four days he uses wet dressings at night and open air treatment by day. As a rule grafts have taken in a week's time.

Transfusion with Preserved Red Blood Cells. By Oswald H. Robertson, Captain. M. R. C., *British Medical Journal*, June 22, 1918.

The author in his summary says : as first found by Rous and Turner it is possible to preserve living human red blood cells for several weeks in a solution of dextrose and citrate when kept at ice-box temperature. This method of keeping blood has been

made use of recently for giving transfusions at casualty clearing stations during a rush period. A quantity of blood was stored up beforehand ready for use when needed. The blood was kept for varying periods up to twenty-six days before transfusion. Twenty-two transfusions were given in twenty cases of hemorrhage. The results of preserved blood transfusion were quite as striking as those seen after transfusion with blood freshly drawn. There was the same marked improvement, the patients stood the operation well and subsequent progress was quite as good as in those cases transfused by the usual methods. The introduction of kept red blood cells had no apparent harmful effect as there were no reactions or evidence of increased hemolysis after transfusion. The transfusion can be given relatively quickly and the technique, which is simple and easily acquired, can be carried out by one medical officer. Experiments in the transportation of preserved blood have shown that it can be carried a considerable distance without injury.

Study of Brain Wounds. By Lt.-Colonel HARVEY CUSHING, M. R. C., *British Journal of Surgery,* April 19, 1918.

Between July 23 and Oct. 31, 1917, Cushing studied 219 injuries of this character. 22, or 10 o/o, were scalp wounds; 54 or 24.6 o/o were scalp and cranium wounds with intact dura; 133 or 60.7 o/o were scalp, cranium, and dura wounds; and 10, or 4.5 o/o, were scalp and cranium wounds with bursting fractures. In addition there were 20 cases upon whom no operation was possible on account of the bad condition and 11 upon whom no operation was deemed advisable. Of the 133 complicated cases, in the last 45 the mortality dropped from 54 o/o to 28.8 o/o — the technique employed being block removal of bone involved, with excision as done in ordinary wounds. The wound in the brain was washed out with saline solution introduced with syringe and soft catheter. By alternate washing out and suction — all under local anesthesia — the results have improved markedly. The mortality in this series was as follows :

1. Wounds of the scalp with intact cranium and dura : 22 cases in all: 1 death.

2. Wounds of the scalp, local fracture with or without depression, with contusion of brain, dura intact : 54 cases in all; 5 deaths.

3. Local depressed fracture with punctured dura usually with neurological symptoms, but not accompanied by cerebral extrusion : 18 cases; 2 deaths.

4. Wounds usually of gutter type with detached fragments driven into brain with severe cerebral contusion and extrusion of brain, leading frequently to fungus and encephalitis : 25 cases in all; 6 deaths.

5. Wounds of penetrating type with lodgment both of projectile and bone fragments, the brain often extruding, marked contusion along tract, leading frequently to early compression or late abscess : 41 cases in all; 15 deaths.

6. Penetrating or traversing ventricles either by projectile or bone fragments, brain protusion likely or common, hemorrhage or infection of ventricles frequent with escape of cerebro-spinal fluid, when the ventricles were penetrated or traversed by fragments of bone : 14 cases in all; 6 deaths.

7. If penetrated or traversed by projectiles : 16 cases in all; 16 deaths.

8. Wounds with involvement of the orbital nasal or auro-petrosal areas frequently leading to meningitis : 15 cases in all; 11 deaths.

9. Cranial cerebral through and through : 5 cases in all; 4 deaths.

10. Wounds with massive comminution of skull : 10 cases in all; 5 deaths.

Cushing says : " We may say that unless it is proved by investigation a fracture may be supposed to underly every scalp wound made by a projectile " (page 568). " There is no justification in withholding operation from those unfortunates for whom a prolongation of life would seem undesirable... unexpected recovery with unimpaired mental faculties sometimes following what appear to be the most extensive cerebral injuries. "

In studies of 1239 cases by Sargent and Holmes and of 6664 cases by Tuffier and Guillan, recoveries after trephining without epilepsy, insanity, abscess, crippling paralysis, etc., are much more common than would have been anticipated.

The surgical treatment of Group 2, if the external table is depressed, should be block trephining, cleaning out all damaged tissues. If the external table is not broken, individual judgment will decide usually from symptoms as to whether the internal table should be exposed. In groups 3, 4, 5, 6, 7, 8 and 9 — block trephine must be done whenever possible, with careful débridement of all bruised or dead tissues. Care must be taken not to open up the dura widely because of the danger of spreading infection. In fact Cushing attempts without enlarging the dural opening to clean out the damaged cerebral

tissue. In Group 10 — a subtemporal decompression is indicated.

In injuries on the top of the head, attention is called to the longitudinal sinus syndrome which is due to a contusion of the mesial aspect of the hemispheres and is evidenced by bilateral palsies, exaggerated deep reflexes, and Babinski. In these cases Sargent and Holmes have advised against trepanation. After the operation or following trauma, repeated Jacksonian attacks in the early stages may develop, but they usually subside. In controlling bleeding from the sinuses Cushing reports satisfactory results with muscle graft. In the treatment of fungus cerebri and in washing out brain tracts which are drained, Cushing uses Dichloramine T. He has been able at times to wash out or suck out fragments of bone located in the ventricles. Magnet extraction of metal bodies has worked well. When there are large defects in the scalp, Cushing advises against primary plastic closure, except when the ventricle has been opened. Whenever the dura can be closed to avoid leakage and infection, he advises that this be done. Studies of the optic disc have shown edema more frequently than would have been expected especially after the severe injuries. In one case distinct gas encephalitis caused by the bacillus perfringens was observed.

The Automatic Bladder, Excessive Sweating, and Other Reflex Conditions in Gross Injuries of the Spinal Cord. By Henry Head and Geo. Riddoch. *Brain*, Vol. XL, pts. 2 and 3.

This extremely important article has opened up a new field not only in the conception of bladder disturbances following spinal cord injury but, what is more important, in the *treatment* of these disturbances. The monograph is divided into three chapters and an appendix which includes illustrative cases. These conclusions are so all-inclusive of the contents of the article that a summary of them will contain all the important results.

(A) The Automatic Bladder. (1) When the spinal cord has been completely divided, the bladder may begin under favorable conditions to expel its contents automatically as early as twenty-five days after the injury.

In unfavorable cases, where the patient suffers from chronic septicemia, due to a bed-sore, grave cystitis, or pyelitis, automatic micturition may never become established, however long the patient survives the injury.

(2) If a catheter is passed after automatic but involuntary mictur-

ition has become established, and fluid is allowed to run into the bladder under the least possible pressure, it will be expelled after a certain volume has entered. This volume varies between about 100 and 600 cc.

This expulsion of fluid through a catheter, owing to a contraction of the muscles of the bladder wall, can be evoked at a time when the patient is unable to micturate automatically, that is to say, during the period of complete retention. This retention is due to spasmodic contraction of the sphincter mechanism, which does not relax although the muscular wall of the bladder is capable of vigorous contraction.

Later, under favorable general conditions, true automatic micturition may become established, even although the spinal cord is completely divided. When the contents of the bladder reach a certain amount, its muscular wall contracts, the sphincter relaxes, and urine is passed involuntarily.

(3) The form assumed by the activity of such an automatic bladder is entirely independent of the site of the lesion in the spinal cord.

(4) If the spinal cord is gravely injured and if it is even completely divided anywhere above the lumbar region, automatic evacuation and the complete act of micturition may be facilitated by the most afferent impulses passing into the lower portion of the spinal cord.

When the sole of the foot, the thigh, or the abdomen is scratched a flexor spasm may be evoked. If this is so, the bladder may empty itself when its contents scarcely reach one-half of the amount otherwise necessary to produce a contraction of the muscular wall.

(5) After destruction of the lower lumbar and sacral roots, the bladder may act automatically in an identical manner, except that it can no longer be influenced reflexly by any afferent impulses.

(6) When the lesion is confined to the lower end of the spinal cord or to the lower lumbar and sacral nerve roots, the patient may be conscious of tension within his bladder, may recognize the occurrence of contraction in its muscular wall, and may experience that pleasure which normally accompanies evacuation. But these sensations have no effect on the automatic activity of the bladder.

(7) When the bladder is acting automatically, deep breathing may cause the muscular wall to expel its contents before they have reached sufficient volume to be otherwise an adequate stimulus.

In the same way, pressure on the abdominal wall not only tends to expel the contents of the bladder mechanically, but also acts as stimulus to otherwise premature evacuation.

(8) When washing out a bladder, in order to treat the cystitis so frequently present in patients with spinal lesions, it is most important to avoid undue tension on the bladder wall. The fluid should be allowed to run in under the smallest pressure; the vessel containing the wash must not be raised, as is so commonly done, some feet above the bed, nor must the bladder be injected from a syringe. Such methods are positively harmful; for the tone and contractile capacity of the vesical musculature are overcome by such pressure, and the power of spontaneous evacuation thereby diminished. In every case where an automatic bladder is to be washed out for therapeutic purposes, the volume of fluid should be determined at which evacuation occurs, and the bladder should always be allowed to empty itself, as far as possible, in response to endo-vesical stimuli.

Excessive Sweating : (9). In most cases of hyperidrosis, associated with gross lesions of the spinal cord, the outburst of sweating represents the activity of the nervous system *below* the lesions.

Thus when the injury is situated in the lower cervical segments, the whole head and neck may be covered with sweat, because all the fibers which produce sweating leave the spinal cord in the thoracico-lumbar region. A lesion at the level of the third thoracic segment caused excessive sweating over both arms and over the trunk below the second rib; in a case where the injury lay in the sixth thoracic segment, hyperidrosis extended from the fifth rib downwards with some moisture of the palms of the hands. When the injury is situated at the ninth thoracic segment, the hyperidrosis corresponded almost exactly with the analgesia, whilst below this segment the area occupied by this sweating was smaller than that of the loss of sensation. In some cases this sweating may be unilateral.

(10) In favorable cases paroxysmal sweating can be excited by almost any stimulus which sends afferent impulses into the spinal cord below the lesion, for instance : —

a) scratching the sole of the foot, the abdomen, or any part below the level of the lesion, provided it evokes flexor spasms.

b) injection of fluid into the bladder. Inability to pass urine when the bladder is full, is one of the most frequent causes of " spontaneous " hyperidrosis in these cases; sweating ceases when a catheter is passed and the endo-vesical pressure is relieved.

c) injection of fluid into the lower bowel, as when administering an enema.

Reflex Activity of the Spinal Cord below the Lesion : (11) It is evident therefore that under certain conditions the spinal cord below the level of the lesion may show signs of diffuse reflex activity. Scratching the sole of the foot may not only evoke a flexor spasm, but may cause premature evacuation of the bladder and an outburst of excessive sweating. This we have spoken of as a " mass-reflex ".

When the spinal cord has assumed this form of activity, any stimulus giving rise to impulses endowed with affective tone will evoke this diffuse reaction. Not only can evacuation of the bladder and rectum be facilitated by scratching the sole of the foot, but injecting fluid into either of these organs may evoke characteristic flexor spasms.

(12) When the spinal cord reacts with this massive response, it is obvious that the reflexes have, to a great extent, lost their local signature. Not only is the answer the same when diverse parts, such as the sole of the foot, the bladder, or the rectum are stimulated, but it matters little what part of the skin is scratched provided it is supplied by the spinal cord below the lesion. Scratching the abdomen or the sole of the foot may evoke the same reflex response.

(13) Should the local sign of the reflexes be retained to such an extent that primary extension can be evoked by scratching the thigh, though flexion is caused by nociseptive stimuli to the sole of the foot, this diffuse and massive response fails to appear. Evacuation of the bladder cannot be facilitated from the limb which yields a primary extensor response to stimulation of the thigh. We believe that the presence of reflex stepping is another indication that the reflexes have not entirely lost their local signature.

(14) All voluntary movement, sensation, and visceral control may be lost below the level of the lesion, and yet excessive facilitation may not be present. This may be due to the following causes : —

a) The patient may suffer from continuous septicemia or toxic absorption, due to a foul bed-sore, cystitis, or pyelitis. The lower end of the spinal cord has no chance to recover from the first period of shock due to the injury, and reflex activity does not return to any material extent, however long the patient may live.

b) In spite of the severity of the injury, the centers above the level of the lesion may still exercise sufficient control to prevent this widespread reflex activity. The severity of the injury has not

been sufficiently great to prevent the neural mechanism for postural adaptation from influencing the parts below the lesion, though voluntary motion, sensation, and visceral control may be lost. The maintenance of postural activity in man is shown by the existence of primary extensor reactions and the presence of local signature which can be obtained from parts below the lesion.

Military Aspects of the Surgery of the Spine and Spinal Cord. By CHARLES H. FRAZIER. *Surgery, Gynecology and Obstetrics*, June 1918.

This paper was read before the Clinical Congress of Surgeons of North America on October 24, 1917 by Dr. Frazier who is conducting with others a course in neurological surgery for members of the Medical Reserve Corps of the U. S. Army. The technic of the usual laminectomy is well illustrated and its general features are unchanged. A few new details in refinement of technic have been introduced. The clinical part of the paper is based on the excellent observations of Gordon Holmes and this is concerned with localization of the injury in the cord. There appear to be four groups of cases which are determined by the nature, the seat, and the extension of the lesion.

Group 1. Comprises complete transverse lesions with absolute flaccid paralysis below level of injury, abolition of all reflexes and all sensations.

Group 2. Comprises partial lesions; spinal hemiplegias, more or less typical Brown Sequard syndromes.

Group 3. Comprises lesions of compression producing spastic paraplegia, exaggerated reflexes, and positive Babinski.

Group 4. Comprises lesions of the cauda equina.

In localizing the lesion, motor palsies of isolated muscles or muscle groups, including those of the trunk, are even more valuable than the sensory disturbances. Lesions between the second cervical and second thoracic segments are liable to have sympathetic symptoms, i. e., myosis or inequality of the pupils, narrowing of the palpebral fissure; enopthalmos, diminished tear secretion; flushing of the face, diminished sweating and dryness of the affected side.

Lesion of the lower part of the cervical enlargement may show slow pulse, low blood pressure, and scanty urine. In involvement of dorsal segments the corresponding intercostal muscle or muscles may be paralyzed as determined by palpation of the intercostal space during the usual inspiratory contraction. In involvement

of the ninth dorsal, the lower half of the rectus abdominis is paralyzed. In involvement of the 11th dorsal segment there is bulging of the external and internal obliquus over the iliac fossae, but the rectus is not paralyzed.

As to indications for operation, Frazier is very conservative. In direct injuries to the cord he says the propriety of laminectomy cannot be discussed; this, whether the symptoms indicate a complete or incomplete lesion. Oppenheim also believes operation is indicated even in cases of total transverse lesion, for there is nothing to lose and perhaps something to be gained. In indirect injuries, those due to explosion in the vicinity, or to impact of a bullet against the vertebral column without direct impact on the cord, early operation is contra-indicated according to Frazier.

Some Features of Gunshot Wounds of the Chest. By J. F. Dobson, *British Medical Journal,* June 15, 1918.

The principles of treatment are identical with those governing treatment of gunshot wounds in other parts of the body — i. e., *early excision, control of bleeding, removal of fragments of fractured bone and large accessible foreign bodies* (in pleura and in lung), *closure of large open wounds.* According to Gask and Wilkinson [1] operation is not indicated when the wounds in the chest are small and clean, when there is no evidence of fractured ribs, and when the retained foreign body is small. The chief cause of failure after operation is sepsis. Gask and Wilkinson in 67 thoracotomies with immediate chest closure had 22 empyemata (32 o/o), with death in 19 cases (28 o/o). Anderson in 58 thoracotomies with immediate closure had 12 secondary drainages. Roberts and Craig in 25 thoracotomies had 40 o/o fatalities, most of which were presumably due to infection. Lockwood and Nixon in 82 thoracic and abdominothoracic cases with immediate closure had 24 deaths (29 o/o), 5 cases developed empyema. Duval in 29 thoracotomies had 8 deaths (27 o/o) with 9 empyemata. Early complete operation with closure gives better results than drainage versus 29.8 o/o with closure.

Later operations. In 25 o/o of cases (Bradford and Elliott) hemothorax becomes infected. This infection is derived (Sir J. R. Bradford) from skin and clothing more frequently than from the lung. These cases must be drained and preferably through a wide incision which allows of thorough inspection and repair of damage to the

1. *Brit. Med. Jour.*, 15 Dec. 1917.

pleura and lung. Antiseptic installation should supplement the operation (Tuffier's method with Carrel tubes supported in wires and inserted into the pleural cavity in all directions).

The author uses a special silver cannula introduced near the upper limit of the cavity — third and fourth space near mammary line — and drainage incision closed about the drainage tube. Irrigation every two hours is made through a cannula or Carrel tubes (Tuffier technic). The results are striking; the general condition improves rapidly, the discharge diminishes, the lung expands quickly, and the cavity closes in short time. Tuffier and Depage after sterilization close the chest cavity by secondary suture.

In neglected cases infected hemothorax leads to chronic empyema with failure of lung expansion. For these, Estlander's, Schede's Wilms' operations, with decortication are necessary. In incomplete lung collapse it is essential to free the lung from its adhesions to the chest wall on both sides of the empyema cavity — these " barrier adhesions " may be separated in early cases with the fingers but in late cases must be cut. This is more important than decortication. In complete lung collapse extensive osteoplastic operations have their field.

Gunshot Injuries of the Lungs. By Capt. EGGERS, *Surgery, Gynecology and Obstetric*, June, 1918.

This report is based on 30 cases studied in 1916 in a hospital at Eylau, Germany, and is of particular interest as it shows what the Central Powers are doing for these injuries. Sauerbruch reported 836 lung injuries in 22,145 wounded. Of 300 dead soldiers examined on the field 30 o/o had lung injuries. He believes that the mortality of injuries of the thorax is somewhat over 40 o/o.

The author summarizes the treatment of gunshot wounds of the lung as follows :

1. Treatment of clean, smooth wounds of the thorax and lungs is simple and strictly conservative. Rest in bed, elevation of the upper part of the body, morphine, dry sterile dressing, no transportation.

2. Perforating gunshot wounds of the thorax and lungs with a closed pneumothorax or without one, should be treated conservatively.

3. Hemothorax producing alarming symptoms of compression should be aspirated early, removing just enough fluid at first to relieve the symptoms.

4. Hemothorax running a normal course but showing no or little tendency to absorption should be aspirated to prevent the formation of a thickened pleura, contraction of the lung, etc

5. An infected hemothorax should either be aspirated at first and later have a rib resection, or if the symptoms are urgent, the resection should be done at once.

6. An open pneumothorax with a small external opening should be closed by suture if the wound is clean, otherwise by a fir, a dressing, or a tampon.

7. A pneumothorax with a large opening should promptly be treated surgically. If only the thoracic wall is injured the wound edges should be excised and the lung sutured into this window. In case the lung also has been perforated, this wound should likewise be excised and sutured, and this portion of the lung then fastened into the thoracic window (Sauerbruch, Landois, Burckhardt, Jehn).

8. In order to do these operations satisfactorily, it is advisable to have a simple positive pressure apparatus on hand.

9. In perforating injuries of chest and abdomen by rifle bullet or shrapnel balls, in which the course of the missile would indicate that the stomach or intestines might be injured, a primary laparotomy should be done at once. The thorax wound is treated conservatively. If the injury is due to shell fragment and an open pneumothorax is present, it is better to do a trans-diaphragmatic laparotomy. Injury to the abdominal organs is attended to through the opening in the diaphragm.

The Selection of Abdominal Cases for Operation. OWEN RICHARDS. *British Medical Journal*, April 27, 1918.

The real failures are the cases in which the patient is wrongly classed as moribund when operation might have saved his life, and those in which a penetrating wound of the abdomen is not recognized as such until it is too late.

Difficulty lies in determining the circumstances under which operation ceases as a rule to be worth while, even though it may yield to occasional success. The decision as to whether a man wounded in the abdomen should be operated on or not is usually based on the time which has elapsed since the injury and upon the rate and character of the pulse.

The question is: what period of delay renders operation as a rule unprofitable? If we assume that wounds which open the stomach or intestine are necessarily fatal, if untreated, and that hemor-

rhage is not, the proportion of profitable operations in this series to those which were nearly successful is :

In the first twelve hours	4 to 1
" " second " "	2 to 1
Later	1 to 3

It is impossible to lay down any rule, but roughly, it seems that operation is very profitable in the first twelve hours.

Of the patients who survive operation performed in the first twelve hours a high proportion will have had their lives saved by it, and this is true in a lesser degree of those operated on in the second twelve hours. After this time, most of those who survive operation are those whose injuries were not originally fatal.

Men with a pulse of 120, or over, have less than half the chance of survival which men with a lower pulse have.

Recently wounded men, with a rapid pulse, should nevertheless be operated on, provided that their condition is as good as it is ever likely to be, that they have a reasonable prospect of surviving the actual operation, and that the time taken does not prevent the proper treatment of other wounded

If care is taken to exclude those who have been wounded too long, and those whose condition is too bad, there still remains the danger of failing to include those who have scarcely any symptoms. Every wound of the abdominal wall, however slight, should be explored, whether signs of intestinal injury are present or not. If it is found td be penetrating, the abdomen should be opened.

The only other difficulty which arises in selection is to balance the claims of abdominal cases against those of other wounded in busy times. The necessity for deciding between these claims can be best avoided by good theatre organization, the provision of two tables for each surgeon, and by not allowing slow operators to do abdominal work. A competent surgeon, with a good nurse helping him, can open the abdomen, search the small and large intestines, and close it, in twenty minutes. Ordinary repairs will extend this time to half an hour.

If these measures are insufficient the decision should be left in the hands of the surgeon in charge of the pre-operation ward.

The Effet of Dichloramine T Chlorinated Eucalyptol Solution on the Peritoneum. By S. P. Reimann and J. A. H. Magoun. *Surgery, Gynecology, and Obstetrics*, June 1918.

Reimann and Magoun report unfavorable results with this solution.

which, when used as a 20 o/o solution, caused clotting of blood and exudate on gauze and drains, and led to interference with drainage and trauma. In dogs it produces a hemorrhagic fibrinous exudation. Even a 7 1/2 o/o solution on the dogs' peritoneum produces the same bad results and no benefits.

Treatment of Wounds of the Pelvic Basin: Especially of the Bladder and Rectum. By M. J. Tanton. Report before the Second Session of Interallied Surgical Conference.

In this very important article Tanton discusses:

A. *Isolated Wounds of the Bony Pelvis.* These represent about 1.06 o/o of all war wounds. In examination of recent wounded (3716 new cases as well as 414 old ones) the lesions were distributed as follows:

	Recent	Old
Iliac Bodies	1050	199
Iliac Crests	311	43
Sacrum	652	62
Coccyx	24	1
Sacrum and Coccyx	21	4
Wing of Sacrum	20	2
Sacro Iliac area	120	41
Pubic Bone	202	12
Pubic symphysis	12	2
Pubo-ischial ramus	47	10
Ischium	241	20
Ilium and others	60	9

(Note: In a large number of lesions the exact site was not mentioned.)

These lesions may be most complicated and serious, and may be associated with injury to the urethra, retroperitoneal suppurations, opening and infection of the meninges, severe hemorrhage, especially following gluteal artery injuries, and injury to the sacral plexus and its branches. Serious infection, especially gas gangrene, is common. Chronic osteomyelitis is the usual sequela.

Treatment: Debridement in early cases. Excision with well arranged drainage in late cases.

B. *Wounds of the Bony Pelvis and of the Bladder*: 367 Cases. Of 334 recent cases 68 intraperitoneal and 266 extraperitoneal vesical injuries. With intraperitoneal injuries other viscera are often damaged. In severe cases a traumatic extrophy may result.

Treatment of intraperitoneal cases. Debridement of the whole

wound with sutures in layers of the hole in the bladder (and other organs). If bladder cannot be completely closed, the nonsutured part should be extraperitonealized (with suprapubic drainage). In completely closed cases, permanent catheter or regular catheterization may be used. (Recommends drain in Douglas for two to three days).

Extraperitoneal cases are more difficult to treat. There should be surgical excision of wound, primary suprapubic cystostomy. Some cases heal spontaneously with urine leaking through wound or wounds. If serious fractures are present; infection is likely and grave consequences may develop if the urine has not been sidetracked by cystostomy.

External urinary fistulae and osteomyelitic fistulae are frequent sequelae. Internal vesico-bone fistulae also occur. These may lead to calculi. Ascending pyelonephritides are quite common.

C. *Wounds of the Rectum with or without Lesions of Bony Pelvis*: 517 Cases.

273 cases rectum and bony pelvis involved (sacrum and coccyx, less frequently sacroiliac area; ischium; wing of ilium and acetabulum). Extraperitoneal; serious infections, extra or intraperitoneal, are very liable to develop, though early operation (débridement with or without closure of the tears) leaving the whole wound wide open, may lead to excellent results. Some advise artificial iliac anus as routine. Others recommend constipation with opium. Stercoral fistulae are common sequelae but they usually heal. Sphincter disturbances are common.

D. *Associated Wounds of Bladder and of Rectum*: 224 cases.

Intraperitoneal are much less frequent. Laparatomy is indicated. In 16 cases, 14 died.

Extraperitoneal are either vesicorectal or anaurethral (prostatic urethra).

Treatment is directed against passage of feces by rectal wounds and into bladder, as well as prevention of infection. Wound in rectum should be sutured or the anterior rectal wall should be lowered (pulled down) so as to block the vesical opening. The bladder should be drained by catheter (in dwelling) or cystostomy (suprapubic). Colostomy has but few adherents while cystostomy is getting more popular. The author is inclined to avoid the latter and do the former. Subsequent plastic operations may be required for stenoses and prolapse incontinence as well as for chronic fistulae.

Primary and Delayed Primary Suture in the Treatment of War Fractures. By William S. Baer, Major, M. R. C., assistant director, Orthopedic Surgery, A. E. F. *Journal of the American Medical Association*, May 25, 1918, ol. LXX, No. 21, p. 1531.

The treatment of war fractures is the treatment of wounds of the soft parts plus the added difficulties which the injuries to bony tissue involves. The principles to remember are :

1. All battle wounds are to be considered as infected.

2. It is necessary to remove all projectiles, clothing, and devitalized tissue as early as possible; at least before the twelfth hour after injury.

3. These wounds can then be considered as aseptic in character and a primary suture made, thus converting compound fractures into simple fractures, and appropriate treatment for these simple fractures thereupon instituted.

Experience has shown, says Baer, that from 80 to 95 o/o of cases may be treated by means of primary suture.

I. *Technique of Primary Suture* : Absolute asepsis throughout. Skin disinfected with iodin or other method. The skin edge with the tract made by the projectile is removed. All projectiles and all devitalized tissue are removed. Complete hemostasis. Approximate skin edges without tension.

It has been said that 10 o/o of battle wounds cannot be primarily closed, even if received within twelve hours after injury. Such cases are (1) those in which shock is so great that a complete operation cannot be done ; (2) those in which for any reason whatever all foreign matter cannot be removed; (3) those in which the loss of substance is so great that complete closure is impossible.

Cultures must be taken at time of suture and some wounds must be reopened immediately on bacteriological report, e.g., those primarily infected with the virulent types of streptococci.

II. *Delayed Primary Suture* : Performed from three to ten days after the primary operation, where (usually for military reasons) a primary suture has been deemed inadvisable. The primary operation is performed as in primary suture, the only difference being that the skin edges are not brought together until later. Primary suture should never be done where prompt evacuation is necessary or where a roentgenologist and a bacteriologist are not present. Good team work of surgeon, roentgenologist, and bacteriologist is absolutely necessary. Patients with primary

suture should be under observation for at least ten days; so that the wound may be watched and not subjected to the traumatism of transportation. Where this cannot be done delayed primary suture is practised.

III. *Fractures*: Baer insists that by the use of the principle of primary and delayed primary suture the entire subject of the treatment of fractures has been changed. One no longer treats compound fractures except by the simple procedure followed in the case of a simple fracture. But such cases should be operated upon within eight hours of the casualty and the handling of the wounded must be accomplished with this end in view. Hospitals adequately staffed and of sufficient size must be located in the zone of the advance so that the wounded may be handled in good time and be permitted to rest at the hospital in which they have been operated for at least ten days.

Gunshot Wounds of the Knee Joint. By KELLOGG SPEED. *Journal of the American Medical Association*, March 30, 1918.

In our present series of 85 patients, the synovial lining of the joint was opened by the missile in every instance. There were two deaths. In both cases the patients suffered bone injuries at the knee, and one died from a gas infection of his arm, which was amputated, although the knee was apparently doing well. In reality, then, there was only one death caused by the knee injury, due to generalized sepsis, since no secondary operation was performed.

The synovial surface alone was involved in 42 instances, in 3 of which, or 7 o/o, amputations were made. There were bone injuries accompanying 43 knee wounds, in 6 of which, or 14 o/o, amputations were made. We might suppose, then, that a knee gunshot wound which causes simultaneous bone injury is twice as liable to go on to amputation as one without bone injury. Clinically there seems to be a higher ratio.

In the light of results of recent experience, after a knee-joint injury, the soldier should be splinted at the first dressing post and not be allowed to walk on the leg. All operations should be done at the casualty clearing stations, within 24 hours after the wound is received, when possible, or better yet, within 8 hours.

Types of knee injury to be retained at the casualty clearing station are:

(1) Those complicated by serious bone or blood vessel injury.

(2) Distended painful joint, or early signs of septic inflammation.

(3) Foreign body visible or palpable after it has opened the joint.

(4) Larger superficial wound, generally caused by shell fire, opening into the joint. Sepsis is certain to spread into the joint and immediate operation is indicated.

Early operative treatment is either radical or conservative. Radical treatment calls for either amputation or resection.

Every knee-joint gunshot wound should be operated on, if time and circumstances permit. The most innocent appearing may lead to serious trouble. The successive steps are as follows:

(1) Careful skin shaving and disinfection.

(2) The track of the missile is completely, carefully, and slowly excised with a sharp scalpel, but no scissors. No fingers or instruments are inserted through the solid wound into the joint, since not only may infection be carried in, but the foreign body may be pushed into an inaccessible area. The comminuted bone and foreign bodies are removed.

(3) The joint may be irrigated with physiologic sodium chlorid solution.

(4) The wound is closed in layers. If the synovia cannot be closed, a gauze pack is placed down to its surface.

(5) A Buck's extension is attached to a Thomas splint on the leg, and flannel bandages cover all.

Each operation takes from forty minutes to two hours.

When aseptic healing is in progress and the joint is not painful, slight passive motion may be started during the second week. Staphylococcus infection is less to be feared than streptococcus.

These wounds are excised, the synovial edge trimmed, and the joint irrigated because, without a doubt, the synovial surface is almost as well able to take care of itself as the peritoneum, if given a chance, and the resistance of the joint surface is greater than we have been led to believe. After trimming and irrigating, the operator closes the joint snugly, and its own resistance will often do the rest. Splinting prevents motion, and hence favors an early healing of the sutured synovia.

When sepsis of the joint threatens to follow conservative treatment, or no operative treatment at all, the author is inclined to side with Page, who says that no classical drainage of the knee joints is satisfactory and that the joint excision after infection is valueless. Early amputation is advisable. Long courses of joint sepsis, despite radical drainage, give too high a mortality.

SUBCRURAL POUCH DRAINAGE AND INVERSION TREATMENT :

The joint is proved septic and steps should be taken at the earliest stage. Under anesthesia an opening one inch long is made in the middle of the thigh at the upper margin of the pouch. The quadriceps extension muscle fibres are separated longitudinally by a pair of May scissors, and the synovial surface of the joint is carefully opened through its upper reflection only. A medium-sized rubber tube extending just into the joint is sewed into place. The incision around the tube is left wide open to permit the secretion to run out, instead of backing into the thigh tissues. A Thomas splint and extension are applied, the left being supported by cross pieces of perforated metal both anteriorly and posteriorly, and being thoroughly padded and so bandaged that the portion over the wound can be removed for dressing without loosening the splint. The patient is then put to bed, a Balkan frame is adjusted over him, and for two hours night and morning, he is turned over on his face. Later these periods are extended until he can lie there for hours at a time.

Patients so treated should be in the early stage of joint infection, before erosion of the cartilage has taken place and before the infected contents of the joint have mechanically burst or pathologically necrosed through the synovial surface so as to set up a suppurative periarthritis.

A vertical position of the limb at right angles to the body in the Thomas splint also places the subcrural pouch in a dependent position, but the drainage is not absolute as in the prone position, and there is more tendency for progressive infection of the thigh tissues.

Rules for Treatment of War Wounds of the Joints : (1) At the dressing station, wounds of the joints should be immobilized with great care, in an appropriate apparatus.

(2) At the clearing station, all injured joints in which the wound is extensive, the joint tissues are lacerated or the missile is retained, and especially when a fracture is present, should be operated on, if possible, during the first six or eight hours after the patient's arrival.

3) Roentgenoscopy is indispensable.

(4) *Operation :* Wide aseptic arthrotomy, complete exploration of the joint, systematic removal of foreign bodies. This followed by complete closure, or by closure of the capsule with superficial drainage.

5) Resection, typical or atypical, only when there is considerable damage to the bone.

(6) *In severe suppurative arthritis* : Wide arthrotomy with complete immobilization and progressive disinfection of the wound.

In every grave case immediate resection is required.

Remarks on the Treatment of Fracture of the Lower Limb.

George C. Sneyd. *Lancet*, April 13, 1918.

A great number of old cases exhibit grave deformity. The treatment resolves itself into dealing with (*a*) sepsis; and (*b*) correction of deformity.

A. *Sepsis*. One is tempted to say that the principal treatment of sepsis by suitable incision for drainage is in some degree overlooked. In some cases one has found various treatments by antiseptics and irrigating fluids unsuccessful, or drainage and extension were lacking.

Extension alone helps drainage by preventing pocketing of pus and by allowing free circulation; an immediate fall of temperature ensues in many cases when sufficient extension has not previously been applied.

Too free removal of comminuted bone is not advisable, it may lead to considerable shortening.

The treatment adopted in an early stage should be that of keeping the sinus or wounds clean, while the limb is splinted in the most suitable position with extension, leaving free access for dressings to be applied with as little disturbance as possible to the fracture.

Although many new forms of treatment have been introduced, fomentations remain one of the most useful remedies against sepsis.

They are advantageous in cases of cellulitis.

In these conditions good results follow a very minute dose of autogenous vaccine, 1/2 to 1 million streptococcal, accompanied by an injection of serum. The author has seen great benefit result from the use of sulphur and glycerine. Bipp also appears to lessen reaction after operation, such as sequestrotomy.

B. *Correction of Deformity* :

When sepsis is well established it may be very unwise to interfere with deformity. If the case is a recent one, sepsis would be minimized by extension. Three months should be the absolute minimum. Good results cannot be obtained by any one method. One has at times to rely on operation, at others, on various methods of splinting, depending on the individual case.

Lane's method of replacement by open manipulation with powerful bone-lifters, appeals forcibly by its simplicity. Bone-plating in

these cases ensures the accurate apposition of the fragments, which could not be gained by other means. But no septic case should be plated.

Sometimes old cases, where the bone is in a decalcified condition, require two or more plates. It is usual to put these cases up in a Hoefftcke's ambulatory splint.

The author has used a Thomas splint frequently, but has always applied weight extension (14-25 lbs) — some times to the extension strapping and at others to a spat.

The Hoefftcke splint has often been used for fracture of the lower limb. It is telescopic and the upper flanges for counter-extension are adjustable.

Sinclair's glue extension or adhesive plaster can be used for the purpose of extension in either the Thomas or the war splint. But a properly moulded spat will fit any foot, and, if correctly applied, will not cause any pressure-sores in the ankle region.

Lateral deformity can be greatly improved even in old cases by applying lateral tension with rubber tubing.

ORTHOPEDICS

Some Conditions of Artificial Stumps. By E. Muirhead Little. *American Journal of Orthopedic Surgery*, April, 1918.

It is suggested that those surgeons who see the end results of amputations — six months or more after operation at front hospitals, are doing a service to their colleagues by criticizing their results. Little sees many end results at Rochampton, England, to which patients are referred only after it has been certified that stumps are ready for the fitting of an artificial limb.

In a memorandum on amputations and amputation stumps, issued by the War Office in March 1916, the following are given as the requirements of a good stump :

1. A good covering for the bone;
2. Sound healing;
3. Painlessness;
4. Freedom of movement.

The following conditions were said to prevent or delay the fitting of an artificial limb.

1. Sinuses;
2. Painful nerves or tenderness due to inflammation of the bone;
3. Unsound scars;
4. Contracture in the neighborhood of the joint immediately above the amputation.

Little considers the above points seriatim. Most of them require little elaboration or comment. Painful nerves may usually be avoided by carefully searching for all nerve ends at the time of amputation, pulling them down, and cutting them as short as possible. The tenderness of a bulbous nerve is probably due to a septic neuritis, and a removal of the bulb followed by aseptic healing usually does away with the painful symptoms. Occasionally, however, the newly formed bulb becomes hypersensitive. Prolonged physiological rest often helps these cases. In a few cases the trouble is of central origin.

Not only main trunks but also the branches of cutaneous nerves may be involved. Ulcerating or badly nourished scars can be treated only by the removal of the scar and, if necessary, of enough bone to bring the skin edges together easily. Any considerable contracture is a marked drawback. It is especially objectionable and common in the hips, and its occurrence is fostered by the habit of supporting the thigh stump on a pillow for the patient's comfort. This is often unavoidable, but, if care be taken to use passive extension at the hip daily as soon as wound conditions permit, much trouble may be prevented.

As to the best forms of stumps: the functions of a limb are the influencing factors in determining the kind of stump sought. In the lower extremity the problem is simpler than in the upper, as the main function here is to support the weight of the body at rest and in motion, and to act as the propelling force in the process of locomotion. The strains to which the stump is exposed are the pressure on the end from the weight of the body, and the leverage in moving the artificial limb in locomotion. The upper extremity on the other hand has to perform highly coordinated and complicated motions. These general considerations must always be kept in view.

Generally speaking, the longer a stump the better for the prothesis; the covering should be soft and movable, and the scar should not be adherent to the bone, nor exposed to pressure. The bone should not inflict injury to soft parts when they are pressed against it. Theoretically exarticulation would appear best, but except in the cases of the hip and the shoulder, where there is no choice, exarticulation stumps are not satisfactory: 1. because the

articular end of the bone is too bulky; 2. the joint of the artificial limb, unless it is placed on the sides, makes the joint much larger than the normal one and therefore very unsightly; 3. large flaps are needed, and such are often difficult to obtain and prone to slough. In war work osteoplastic resections are generally out of the question because of sepsis. Even without their aid one ought to be able to obtain 50 to 60 o/o of good end bearing stumps.

The position of the scar is very important; and a posterior scar is preferred in leg and thigh amputations. In the upper extremity non-adherent end-scars are preferable.

The guillotine amputation was originally intended as a temporary measure, reamputation being expected later on. However, healing sometimes occurs without reoperation. It is important to remember that unless the end of the bone is covered by normal healthy skin, and not by scar tissue, reamputation is advisable, and this should not be done prematurely, but only when the parts are in condition to obtain primary union.

As to formation of flaps and position of scars in the various amputations, an abstract of Little's article is impossible. Some important facts to remember are :

1. That in humerus amputations every inch of length gained is an advantage, even if the end of the bone is uncovered, as the artificial limb does not exert end pressure as in the lower extremity.

2. If one cannot get a satisfactory stump below the elbow, it is advisable to amputate just above the condyles. Short forearm stumps are very poor. The best forearm stump is one following amputation at the junction of the middle and lower thirds.

3. As a result of recent improvements, a man is better off with an exarticulation at hip (or amputation through neck of femur) than he is with a stump of six inches of femur.

4. The best thigh amputation is through the lower third: if possible a long hooded flap should be made, giving a posterior scar.

5. For the leg, Little recommends amputation below the middle, though the consulting surgeons at Rochampton recommended a site four inches below the knee joint.

6. When necessary to go below the junction of middle and lower thirds of leg, a Symes amputation gives the best stump. If the metatarsus cannot be saved, it is not worth while to preserve the tarsus. The writer prefers an atypical Symes, dividing the bones well above the malleoli instead of at the usual level, thus avoiding a bulky stump. He also advises making the section at right angles to the axis of the whole leg instead of the lower fourth avoiding a troublesome varus. Care should be taken to remove the

plantar nerves from the flap or to resect the posterior tibial nerve. One should never fail in any leg amputation to section the fibula at least one half inch higher than the tibia.

Report on Amputations of Inter-Allied Conference on the Care of Disabled Sailors and Soldiers. *The Lancet*, p. 881, June 22, 1918.

A. The *kinematic operation* of Vanghetti was discussed by Prof. V. Putti (Director of the Rizzuli Institute at Bologna). The object of this operation is to use the voluntary movements of the muscles of the stumps to move the artificial limb (vitalize the prothesis). In the foreman, these flexors and extensors are covered separately by skin and project beyond the general surface of the stump. At the base of the two clubs thus formed are fastened celluloid rings which actuate chains and produce extension and flexion in the artificial hand. In an amputation of the lower part of the thigh a club loop is formed. By a special plastic operation a canal lined with skin is formed through the muscles and through this a rod is passed. A strap fastened to each end of this rod replaces the quadriceps tendon.

B. *Early Education of Muscles of Stumps.* Dr. Martin (Belgium) said that he begins movements in stumps on the day after the operation. After amputations in the upper extremity he prefers work with tools to mechano-therapy. This develops power of sensation in a stump. Earlier cooperation between surgeon and makers of artificial limbs is essential to greater success.

Dr. Ripert (France) reported 618 cases of *Partial Amputation of the Foot.* When an astragalectomy, subastragalian, or Lisfranc operation were not possible, Patil's advice should be followed and the foot sacrificed.

War Injuries of the Jaws. Norman G. Bennett. *The Practitioner*, No. 591, Vol. XCIX, No. 3.

The first consideration is hemorrhage, but this applies chiefly to cases seen shortly after injury. The lingual or ramus artery, or branches of them, may bleed freely.

The points that next demand attention are support of fractured portions of mandible and abatement of sepsis.

It is best to make use a of light aluminium chin support, held in place by a bandage. Undue pressure may damage the soft parts and promote suppuration and formation of sinuses.

As soon as possible, all loose teeth, broken teeth, foreign bodies, loose pieces of dead bone, and septic roots should be removed, as well as the teeth in the immediate vicinity of the fracture.

There are, however, exceptions to this rule and judgment is required.

As long as free suppuration around the ends of the bone continues, usually with sinuses opening externally, no process of repair can even begin.

The external wound requires ordinary antiseptic dressing treatment.

The objects ultimately to be attained are :

Firm union of fractured portions of bone,

Restoration of the jaws as nearly as possible to normal.

Replacement of lost portions by prothetic appliance.

Union of the soft tissues, with as little contraction and scarring as possible, by immediately suturing or gradual healing by granulation, or with the aid of subsequent plastic operations.

It will be found that most fractures of the mandible sort themselves into three main groups :

The first group consists of those cases in which the anterior portion of the mandible with the teeth contained therein as far back as the premolars, or even the molars, is destroyed.

The second group includes cases of fracture in the premolar or molar region anterior to the masseter.

The third group consists of fractures at the angle, or of the ascending ramus, or coronoid process, or even of the neck of the condyle.

Fracture at the angle is common, and is often associated, when caused by a bullet passing in an oblique direction, with fracture in the premolar region of the opposite side.

In some cases of double or triple fracture, the jaw is so severely comminuted that the various parts are quite loose.

Injuries of the maxilla can scarcely be classified. They may affect any part of it.

The amount of bone destroyed determines, to some extent, the ultimate result to be attempted, and, therefore, the methods to be employed.

It will generally be agreed that with loss of bone up to half an inch in length, bony union may be expected with some confidence. Beyond three-quarters of an inch replacement by natural growth cannot be expected, and the initial course of treatment is to some

extent determined by the intention to make use of a bone graft ultimately.

With small destruction of bone in cases seen soon after injury, immediate methods may be adopted; but with a larger amount of destruction, or in old standing cases, or after division for false union, gradual methods are preferable.

It is now generally agreed that the growth of new bone is not dependent only on the periosteum. Bone may grow outwards from the medullary substance of the fractured ends, or may even be reproduced from small comminuted pieces, lodged between the fractured ends. On this account it is important that sepsis should be controlled as soon as possible after injury, and that no bone should be removed that does not separate naturally as a necrotic fragment.

The cases in which bony union cannot be hoped for without the aid of a bone-graft, demand much consideration. Even in these cases, the writer thinks that the fragments should be reduced to normal positions. If a bone-graft is ultimately successful, well and good; if not, a fibrous union must be accepted, and will probably result in a more satisfactory mandible than if the parts had been allowed to contract with the object of getting bony union.

It is unfortunately true that contraction of the mandible or deviation to one side, so alters the relationship of the alveolar arches as to cause much difficulty in the fitting of artificial dentures, and to impair their efficiency.

There is, however, one form of displacement that materially assists bony union and does not cause loss of occlusion at any moment. In those cases of unilateral fracture through the molar region the larger fragment deviates toward the injured side. This displacement can be corrected, leaving a space between the fractured ends.

Consideration of the usual types of displacement, associated with the different positions of fractures makes it obvious that the treatment will vary greatly. When the fracture is behind the anterior border of the masseter, it is usually sufficient to keep the mandible closed in normal occlusion by suitable bandaging. In fractures of the ascending ramus the elevating muscles on the injured side cause an upward tilt on that side with separation of the teeth on the uninjured side. This can be corrected by gagging the teeth on the injured side and applying upward pressure externally to the mandible. In cases of fracture high in the ascending ramus near the neck of the condyle, complete immobilization is required until the fracture is partly consolidated.

Almost all fractures anterior to the masseter involve displacement. Gradual reduction, and immobilization following immediate or gradual reduction, usually involve the use of some more or less complicated and specially-made appliance.

As for the appliances most useful for reduction and immobilization, the simplest form consists of a cast metal cap splint, fixed with cement to the teeth, and holding the parts in their normal positions.

In simple cases, the well known wire Hamond splint may be used.

Northcroft has devised an ingenious and simple splint of metal. It covers the lingual surface of the teeth, and at the necks of the teeth is provided with upturned lugs; wires passed between the teeth engage these lugs, and the ends are twisted together on the buccal surface.

For cases of multiple fracture of the mandible a simple vulcanite lingual splint perforated with holes, for the passage of bronze wires, by means of which the teeth are ligatured in position to occlude with the maxillary teeth, is very efficient.

The second group of appliances includes those used generally when lateral deviation of half the jaw has occurred. For this purpose, Payne's cradle splint is most commonly employed.

The appliances of the third group are used mainly for correction of displacement of the maxilla. Such appliances are applied firmly to the head by means of an encircling band passing round the forehead; strong wire connections brought round the sides of the face afford a means of giving stability to an intra-oral splint.

Among the most difficult cases are those of fracture with loss of bone in the molar region on one side in which the smaller fragment contained no teeth. It is usually best to begin treatment by immobilizing the larger fragment.

When lateral deviation of the jaw has been corrected, and union of fractured parts has progressed to some extent, it is often possible to use an appliance that will allow the patient some use of his jaw and yet prevent deformity.

Bone-grafting should not be performed until all suppuration and separation of sequestra have ceased and the parts are completely healed; the two portions of the mandible must be fixed absolutely firmly in their correct relative positions by means of an intra-oral splint; in the operation itself, all communication with the oral cavity must be avoided.

The value of massage consists in the prevention of contraction and the softening of cicatrices, and in the diminution of stiffness around the temporo-mandibular articulation.

MEDICINE

Gases in Modern Warfare. Editorial *Journal of the American Medical Association,* April 20, 1918.

Despite the fact that the daily newspapers frequently report the use of poisonous gases in the conduct of the war on the European continent, few physicians understand much more about the methods employed, the substances used, the protections devised and the untoward effects encountered than does the layman who carefully follows the reports from the centers of conflict. After all, this is not strange. Gas warfare is an innovation in the struggle between armies. It seemed so unlikely in 1914 that any enemy would introduce this atrocious form of attack that when the first reports of the preparation to employ it reached the allied forces they were scarcely credited, and no serious notice was taken of the information. With the initiation of the first gas attacks by the Germans in 1915, modern modes of conducting war were radically modified.

The story of the varied types of this hellish performance, of how the unexpected was met and mastered, of the frequently altered forms and phases of gas warfare conducted with the aid of skilled engineers, technologists, and chemists, has scarcely traveled beyond the trenches. It has been full of surprises, replete with difficulties such as confront the student of new diseases, and, if we may forget the awful horror of the consequences, the use of gases has formulated questions of broad scientific import. However terrifying the prospects may be, we must realize that a new and deadly weapon has been used, and its entrance into the arena must be reckoned with by the application of skill and knowledge.

What is the deadly gas, and how is it used? To this the answer may be made that there already are literally a score of harmful gases used in more than one way that have attained some notoriety[1]. First used and best recognized in medical circles was chlorin gas. This is sent out as a cloud from cylinders concealed beneath the parapets. The wind must be of suitable velocity and direction to make the attack effective. Protection is afforded by a respirator

1. The basis for this statement and others pertaining to the subject is found in the report of an interesting lecture by Major S. J. M. Auld of the British Military Mission, as published in the *Journal o the Washington Academy of Science*, 1918, 8, No. 3.

which causes the gas-laden air breathed to pass through an absorbent soaked in solutions of alkali carbonate or thiosulphate. The next surprise came in the form of carbonyl chlorid, or phosgen ($COCl_2$), an insidious gas difficult to protect against. Fortunately, a partial protection was soon found in helmets saturated with sodium phenate. It became apparent, to quote a military expert, that three things really matter in gas warfare, and these were all emphasized at this early period. They are (1) increased concentration of the gases used, so that the protective devices no longer suffice; (2) surprise attacks, whereby the troops are gassed before adequate provision for protection can be made; and (3) the use of unexpected new materials.

Accordingly, when carbonyl chlorid began to be used by the Germans in increased concentration, further provision to meet this became necessary. Here chemical ingenuity suggested the use of hexamethylenamin in conjunction with sodium phenate. On the horror of gas clouds the frightfulness of gas shells presently was superimposed. They are asserted to be the most important of all methods of using gas, and are still in the course of development. The widely proclaimed " tear " gases were delivered in this fashion. Originally xylyl bromid or benzyl bromid, obtained by bromination of the higher fractions of coal-tar distillates, formed the contents of the " tear " shells. A concentration of some of these lacrimators in the proportion of one part in a million makes the eyes water severely. The enormous extent to which such chemical products have been employed is indicated by the fact that the Germans have put down heavy barrages of " tear " gas shells. In 1916, such highly poisonous substances as trichloromethyl-chloroformate were included, the attempt often being made to increase the concentration by the mode of shelling so that some of the gas would pass through the protective helmets, as it actually did at times. Hence we can understand Auld's contention regarding the significance of suitable protective devices. " Respirators, " he says, " have to fulfil two requirements which are quite opposed to one another. In the first place they should be sufficiently large and elaborate to give full protection against any concentration of any gas, whereas military exigency requires that they be light and comfortable. It is necessary to strike a balance between these two. Upon a proper balance depends the usefulness of the respirator. Oxygen apparatus will not do on account of its weight and its limited life. Two hours' life is excessive for that type. The side that can first force the other to use oxygen respirators for protection has probably won the war. "

Last summer witnessed the beginning of the use of a still more harassing gas. An added lacrimator in the form of phenyl carbylamin chlorid has been tried; then came the celebrated " sneezing " gas, diphenyl-chloroarsin, intended to make a soldier sneeze so badly that he will be unable to keep his mask on. But the surprise that scored heavily in 1917 was the " mustard gas, " dichlorodiethylsulphid. As many as 50,000 shells containing this " superlacrimator " have been reported as fired in a single night's bombardment. The effect is most insidious. The gas has a distinctive smell, rather like garlic than mustard. It has no immediate effect on the eyes, beyond a slight irritation. After several hours the eyes begin to swell and inflame and practically blister, causing intense pain, the nose discharges freely, and severe coughing and even vomiting ensue. Direct contact with the spray causes severe blistering of the skin, and the concentrated vapor penetrates the clothing. The respirators, of course, do not protect against this blistering.

In passing, we may recall the German hand grenades filled with bromin, chloracetone, chlorsulphonic acid, sulphur trioxid or dimethyl sulphate — surely a ghastly array! If the " colorless, odorless, invisible and highly poisonous " gas had not yet come to the front, its near relatives have nevertheless been in evidence. MEANWHILE, THE CHEMICAL LABORATORIES OF THE ALLIES HAVE NOT BEEN IDLE.

A Study of 109 Cases of Trench Fever with Special Reference to the Condition of the Heart. By Major T. J. CREAM, R. A. M. C. and Captain B. H. BARTON, R. A. M. C. *Journal of the Royal Army Medical Corps*, March, 1918.

These authors state that apparently there are two distinct types of trench fever.

I. The remittent type with fever of the remittent or intermittent character lasting from five to six days to three weeks or more.

II. The relapsing type with fever for twenty-four to seventy-two hours followed by three to six days apyrexia with abatement of symptoms, then a relapse for 24 to 72 hours, then 3-6 days apyrexia and so on. Cases seldom relapsed with any degree of regularity.

Symptoms. The onset, as a rule, is sudden with headache, usually frontal, dizziness, and weakness of the legs, so that the man falls

down, severe pain in the legs, usually the shins, sometimes in the thighs and very commonly in the back — belly-ache is also a common complaint. The pains are generally worse at night, constipation is almost constantly present, a slight cough is common.

Physical Signs : The pulse is full and bounding — rate 90 to 108; in those cases in which the myocardium is affected it may be of low tension and a rate of 144 or more. The temperature is usually high, 103 to 104 F. The respirations are quiet and unduly increased in frequency. Herpes about the lips and face was noted in several cases. Occasionally there is a slight bronchitis. The heart is quick, normal in cases on the first day, but the myocardium is very commonly affected after a week's illness, there being sometimes definite dilatation. In many cases nothing abnormal was noticed till the patient got up, at which time he had tachycardia and became dizzy and faint, such symptoms persisting unless the patient was put back to bed. The spleen is palpable in some cases. There is often marked tremor when the patients first get up.

Course : Of the length of the illness, the authors are unable to speak, with certainty, as the patients were kept only 21 days, when they were discharged to duty, usually of a light character. Regimental medical officers say that the pains in the shins are often very persistent, men complaining of them at night for weeks after their return to duty.

Treatment : The course of the disease was not cut short by means of drugs. Salicylate of soda, in increasing doses up to 40 grains, was given every four hours.

The main indications for treatment are :

1. To keep patient in bed until temperature has been normal for 48 hours, continuing to keep a careful watch upon the heart after the patient is up.

2. To keep the bowels open — with calomel and magnesia sulphate.

3. To ease pain and promote sleep.

With reference to the heart, the authors found the relapsing type less liable to affection than those of the remitting type — that the earlier a patient is put to bed, the less likely is his heart to be affected. They conclude by stating that possibly many cases of unstable heart of the soldier have their origin in trench fever, perhaps treated by a day or two off duty.

They have published the article in the hope that D. A. H. may become less common.

Vincent's Angina Infection : Its Prevalence, Varied Manifestations, Treatment, and Bacteriology. By Horace Greeley. *American Journal of Medical Sciences.*

In this article, Greeley mentions that Taylor and McKinstry[1] reported that during the last few months over 300 cases of the malady had been confirmed bacteriologically. Quoting Bonby[2] he stated that in time of peace the disease constitutes about 2 or 3 o/o of all cases of throat complaints, among the French Army. Recent statistics from a British Military Hospital in France show the proportion to be as high as 23 o/o of all throat complaints. He believes that there are sufficient reports to indicate that the malady is of universal distribution although severe cases are not very common under normal conditions in civil practice. Among civilians he has noticed an apparent increase in the number of tonsillar and pharyngeal smears both in hospital and private practice that show the fusiform sperelleform organism.

Predisposing Causes : General debilitating diseases — viz., extreme fatigue, chilling, improper food — and excessive alcohol. Local influences are decayed teeth, excessive smoking, or chewing of tobacco.

Exciting Cause : Undoubtedly the organism so constantly associated with the lesions.

Location and Appearence of Lesions : Heavy dirty looking membrane covering one of the tonsils or any place upon the nasopharyngeal or buccal mucous membrane. It may extend over most of the surface of the upper respiratory tract.

Symptoms : Headache; malaise; glandular swelling adjoining the ulcerations; slight temperature; membrane which forms usually after symptoms have lasted for several days.

Severe forms reported from the European Military Hospitals have manifested great prostration, high fever, and albuminuria.

Treatment : Preventive — teeth put in best possible condition avoidance of tobacco.

1. *Brit. Med. Jour.*, March 31, 1917.
2. *Brit. Med. Jour.*, Nov. 24, 1917.

NEUROLOGY AND PSYCHIATRY

War Neuroses. By Wm. B. Terhune, 1st Lieut. M. R. C., U.S.A. *Journal of the American Medical Association*, May 11, 1918.

Nomenclature : As there is no definite knowledge of the neurologic pathology and as the psychologic processes are largely surmise, numerous terms have been suggested. Eder makes use of the term " War Strain ". Babinski has originated the word " pithiatism " to describe a hysteroid state in which the symptoms are the result of suggestion and may be relieved by suggestion. All other forms of war neuroses he has designated as " reflex nervous disorders " and he believes they are on the border line between functional and organic disease.

British Medical officers consider the disease as purely functional and employ the terms " shell shock " and neurasthenia — the differentiation depending on whether or not the individual has been exposed to extraordinary strain. Shell shock as a diagnosis has resulted in an increase in the prevalence of the disease — chiefly because of this the name is not used until the patient has been carefully examined in a hospital especially for nervous disorders and not then until information has been obtained from his unit verifying his own statement as to how his illness arose. Malingerers will attempt to imitate this condition when it is remembered that many men at the front suffer from mild forms of it and that a man who wishes to shirk his duty may easily exaggerate these mild symptoms.

Predisposing Causes : To suffer from shell shock does not necessarily stigmatize an individual as neurotic, although many of these patients have suffered in civil life from various forms of mental instability. Landenheimer states that 90 o/o were predisposed before joining the army — Forsythe 100 o/o — Mott 66 o/o — Eder 30 o/o. However, some of the most courageous men apparently free from all neurotic tendencies are affected. The disturbance occurs among commissioned officers, non commissioned officers and privates — a relatively larger percentage amongst the non-commissioned officers and yet they are the men chosen especially for their bravery and dependability.

The men are constantly under a strain, physical and mental

For several miles behind the line there is no place of safety, and sleep is often out of the question. The knowledge of bombing experiences that may be repeated at any time does not tend to increase mental composure — the men often continue to dodge shells after being admitted to a hospital, so vivid is the memory to them. Fatigue is also a very important factor. It is very doubtful if psychoneuroses occur as the result of fatigue unless associated with intense emotion. Fear is one of the strongest of the emotions and while it may be repressed, nevertheless it exists and exerts its influence.

Symptoms : Headaches are probably the most constant symptom, especially in the occipital region. Insomnia is quite common. Cyanosis of the hands is noticeable. About 1 4 of the patients have tachycardia.

Treatment : Military discipline is never relaxed. Drugs are of very little use. Verinal is given for insomnia — phenacetin for headache. In acute cases, several hours in a hot bath seem to be more beneficial than anything else. Mild cases are practically well in a few days and return to their units. A man is in better condition to return to his unit after a month on a farm than after the same length of time in a convalescent dépôt.

OPHTHALMOLOGY AND OTO-LARYNGOLOGY

War Injuries of the Larynx. By W. Douglas Harmer, Surgeon-in-charge of the Throat Department of St. Bartholomew's Hospital. *The Lancet*, June 15, 1918.

The author presents the results of his study of 255 cases of injury to the larynx.

He notes that the commonest place of entry is the anterior triangle of the neck, in the region of the thyroid cartilage. Injuries of the larynx between the vocal cords and the cricoid are the most serious. The pharynx or esophagus is often included. Healing of wounds in the larynx is usually rapid and satisfactory. A considerable proportion develop cheloid or scar-tissue.

Classical symptoms were remarkable by their absence. Cough, dyspnea, blood-spitting, dysphagia, bruising, edema, or inflammation may never occur. Voice is generally lost at once. Hemoptysis

is common. Dysphagia is common but transient. Even when the food passage is itself involved, there may be no dysphagia. Injury to the vocal cords is common and paralysis of them from nerve injury or from shock is also frequently observed. Complitions are greatly to be feared in the early stages.

Treatment : The first essential is to prevent choking. In doubtful cases tracheotomy should be performed. Nearly a third of the cases required the use of a tube at some time in the course of treatment. Crico-tracheotomy, though easy, is not advisable because the larynx is narrower than the trachea and because the tube if not well tolerated. Inferior tracheotomy is especially liable to complication, and should be practised only when a permanent tube is necessary.

Suture of the air and food passages is the conventional one. To save life partial or total extirpation of the larynx is necessary, because a gangrenous condition of the tissues, if they are badly shattered, often results in death.

Foreign bodies should be removed in all possible cases.

For stenosis a small cannula at first suffices. The patient should wear a tube corked for months before it is finally removed.

There is a comparatively high mortality from wounds of the larynx. More deaths occur at the front than at the base or in England. Of the 108 cases upon which the author chiefly bases his remarks, there were only 5 deaths. Death is commonly due to sepsis, pneumonia, hemorrhage, and dyspnea. The latter are chiefly active in the early stages. In two-thirds of the cases surviving for a week, recovery is complete. In many cases voice weakness persists. Paralysis is another frequent impediment among the unfortunate third that do not recover completely; only a small proportion recover from abductor paralysis. In only a few cases does total paralysis supervene.

The author thinks many of these wounds might be avoided if a band of steel were worn inside the collar to act as a protection similar to that afforded by the helmet.

Normal Gun Deafness. By T. B. Jobson. *The Lancet*, No. 4911, Vol. CXCIII.

To get anything like correct results with tuning fork tests the patient must concentrate on the subject and help the investigator all he can. After trying forks of different wave-lengths the author decided to use C_2, which gives 512 double vibrations. The higher forks are heard for such short periods that no accurate results could

be obtained in an investigation of this kind. The following are the details of the cases examined :

Total examined : 73.

13 cases were excluded for the following reasons :

For old suppurative otitis media	8
Nasal obstruction	1
Enlarged tonsils	2
Head injury	1
Otorrhea	1

The conditions of the membranes in the 60 accepted cases were as follows :

Normal	39
Dull	16
Retracted	3
Increased mobility	2
Cerumen removed	2

The type of deafness is a fairly definite one — mixed obstructive and nerve deafness.

From this investigation it may be concluded that exposure to gun-fire in the present war often produces rapidly a permanent deafness. The amount of deafness as shown by a C_2 fork is about 10 seconds aerial conduction and 1 seconds of bone conduction.

An Address on Concussion Injuries of the Visual Apparatus in Warfare, of Central Origin. By S. A. Kinnier Wilson. *The Lancet,* No. 4897, Vol. CXCIII.

Cerebral Concussion and Commotio : In most cases of severe blows on the head which have proved fatal, examination has shown the presence of capillary hemorrhages, and consequent disintegration of myelin, such as are sufficient to account for the clinical symptoms.

In non-fatal cases it is justiciable to assume organic lesions such as have been enumerated, which have not, however, been sufficiently widespread or serious to affect permanent impairment of the cerebral function.

The question of molecular concussion or commotio presents from the clinical side features of importance. Clinically there is, at the one extreme, a total motor and sensory paraplegia ; at the other, the tremulous, weakness, paresthesia, and exaggerated reflectivity of " functional " disease. Experiments performed by Alan Newton suggest that there is an organic basis for the transient disturbances of function seen in so-called " railway spine " and

allied conditions of traumatic neurasthenia, and they bear out what has adready been remarked that " functional " symptoms may be the expression of minimal organic changes. They also prove the occurrence of a relatively surprising amount of tissue change from a feeble impact on the exposed cord, and show that the blow capable of producing merely a molecular concussion must be slight.

While gross contusion lesions of the central visual apparatus are common enough one may have to seek far and wide ere one can find a case which for the purposes of this communication may be admitted into the category of visual concussion, where, one may suppose, the organic disturbances are of the trivial nature that has already been described.

After two and one-half years one is still looking for a case where a direct blow on the head from any form of projectile, without gross wounding, has resulted in an uncomplicated visual commotio analogous to the cases of spinal-card or peripheral-nerve commotio that have been, relatively speaking, common.

Let it be observed that all cases of visual disturbances from shell explosions *in the vicinity of* the individual concerned are purposely excluded.

All cases of head wounds with resultant and more or less permanent organic visual defects are also excluded.

We are left, then, with cases where a blow on the head produces visual symptoms that tend to clear up, but does not result in a permanent hemianopia in any of its varieties or other type of organic symptoms.

In a case mentioned by the author, as X-ray and the fact of operation indicate, we are dealing with a lesion of undoubted severity, the outer table being splintered and the inner being cracked, and perhaps slightly splintered also. It must be borne in mind that the patient was unconscious for at the most three minutes, that there was no evidence of intracranial pressure, that the absence of any form of scotoma or hemianopia was proof of the general integrity of the visual cortex, and that the vesico-psychic areas were similarly intact.

If, therefore, there is structural integrity of the visual cortex, we are justified in associating the visual phenomena with the fact of a violent concussion over the occipital poles. The following are the reasons for not regarding the case as traumatic hysteria :

With the exception of the visual symptoms, no impairment of function of the nervous system was discovered. Concentric diminution of the visual fields has never been described as an isolated phenomenon in hysteria. Moreover, an interval of hours or days

intervenes between the shock-producing stimulus and the development of a traumatic psychoneurosis such as hysteria.

By way of contrast, cases may be selected in which, notwithstanding head injury and cerebral concussion amounting perhaps to contusion, the visual symptons are derived from another source. In some cases, in spite of the general cerebral concussion, unconsciousness, and immediate blindness, the persistant visual defect is clearly seen to be of the nature of so-called " subconscious malingering ".

The question of interpretation of the visual phenomena in the first case quoted is of considerable importance. The view here put forward is that symptoms usually held to be " functional " in type may be the expression of a direct visual concussion, undoubtedly an organic condition. These symptoms are concentric restriction of the visual fields and the occurrence of helicoid or spinal fields with certain tests.

In regard to the first of these, it must be borne in mind that such concentric diminution supposed to be characteristic of hysteria does certainly occur from head injuries.

In certain cases of organic injury of the central vision mechanism, by concussion or otherwise, the result is constriction of both fields, occurring by itself and without evidence of subconscious vision in the remainder.

The author has not been able to find any reference to helicoid fields in recent war literature with the exception of a comment by the late M. Jessop at the discussion on shell shock without visible signs of injury, at the Royal Society of Medicine. Jessop there stated that he had had under his care numerous cases of temporary blindness following the explosion of shells. " The blindness lasted under a week, and generally about two or three days. Both eyes were always affected, the pupils were active to light and the ophthalmoscopic appearances normal. The fields of vision were sometimes contracted, but more often normal; in only two cases did I find a spinal field.

For the present, it appears a reasonable contention that in certain cases without permanent visual defect of the accepted organic type of hemianopia or scotoma constriction of the fields, and helicoid or spinal fields, may be the expression of an organic change, the basis of which is a violent commotio, or a concussion amounting to contusion, of the visual cortex or some part or parts of it not more closely to be specified, or of the subcortical visual projection system.

WAR MEDICINE

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WAR MEDICINE *accepts no original articles. Its scope is limited to the publication of the proceedings of the Research Society of the American Red Cross in France, to abstracts of original articles, and to editorial comment on subjects pertaining to the medicine, surgery, and hygiene of the war.*

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THE RESEARCH SOCIETY OF THE AMERICAN RED CROSS IN FRANCE

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EDITORIAL COMMENTS

A number of editorial notes and announcements have appeared in various numbers of the *Medical Bulletin*; but, up to this time, no department devoted to editorials has been deemed necessary. It seems, however, that with the natural development of the only medical publication for the rapidly growing American Expeditionary Forces in France, its educational effect may by enhanced by the judicious use of editorial comments.

As in the other departments of *War Medicine*, the editorial comments will be limited to subjects of interest to medical officers on duty with the American Expeditionary

Forces. The abstracts of original articles appearing in *War Medicine* endeavor to present, impartially, the authors' views; but it is often desirable to make a critical review of important contributions to medical literature, and a department for editorial comments appears to be the best means of meeting this need.

It has been suggested that since *War Medicine* is the official organ of the Research Society, editorial notes or comments on its meetings, giving impressions, or brief summaries, of some of the most important facts brought out in the discussions, would call attention to the fuller reports as published in the same number, and, by thus adding interest, would perhaps make them of greater practical value.

In order to make such editorial comments of authoritative value, those bearing upon subjects which come properly within the province of any of the regularly organized divisions, or sections, of the Medical Department of the American Expeditionary Forces, will be referred to medical officers in authority for review and comment. Furthermore, heads of divisions and those in charge of various activities of the American Expeditionary Forces will be requested to contribute editorial notes or comments on subjects related to their work. It is thus hoped to present many valuable and authoritative contributions, not intended in any sense to be official, on matters of vital importance in Army medical work.

The editorial comments in *War Medicine*, therefore, will not present merely the opinions of the editor, but will reflect the collective ideas of a number of men who desire to give medical officers the correct viewpoint on matters that will be helpful to them in performing their duties as Army surgeons.

THE RESEARCH SOCIETY

In his presidential address before the American Medical Association in 1896, Dr. Nicholas Senn said: "Medical Societies are the great post-graduate schools for physicians; and medical journals their best text-books."

The truth of the first part of this statement is apparent to all who attend medical meetings, but particularly so to those

who have had the privilege of attending the meetings of the Research Society of the American Red Cross, organized to aid the American Expeditionary Forces in France. Since it takes a year, or perhaps two, to write the average text-book, and to get it into print, physicians can learn the technic for new operations, the modifications of old ones, the recent improvement in medical procedures, and the advanced methods in sanitation, only from current medical literature.

The thousands of physicians who are with the American Expeditionary Forces in France have found themselves, as military surgeons, in a foreign country, where most of them do not understand the language. They cannot attend meetings of medical societies to learn from the experience of others how to deal with the problems which are new to them, and they have no books and medical journals to which they can refer for advice. Therefore the need has been very great for instruction or training in the problems that have arisen during the war, many of which have been solved by our medical confreres in the French and British Armies.

To meet this need, last October the American Red Cross in France organized the Research Society to cooperate in, and to supplement, the instruction given to medical officers in the Medical Department of the American Expeditionary Forces.

Meetings have been held every month with an average attendance of about two hundred medical officers, consisting of heads of departments and representatives from the various hospitals and divisions of the American Expeditionary Forces. The subjects dealt with have been those of greatest importance to the surgeons of our fighting forces, who have thus been able to profit by the experiences of French and British authorities on various medical problems of the war. The presentation of these problems by some of the greatest living surgeons and medical authorities has proved to be of inestimable value to those who were privileged to attend these meetings. While representatives of the French and British Armies have taken the larger part in these discussions, many distinguished American physicians and surgeons have presented the American viewpoint.

The representatives of the various hospitals and divisions

who have been present have reported the meetings at conferences with the medical officers connected with their units: and the heads of the divisions have carried into effect the practical and helpful suggestions that have been made by their confreres.

The benefits derived from the meetings of the Research Society have been far reaching. They have resulted in a closer acquaintance, and a more cordial relationship with our French and British confreres, which will be helpful not only during the war, but also during the peace that is to follow the crushing of the Hun's military power; for it will make for a broader understanding among the medical men of the three great nations that will continue to be allied in the interest of science and true culture, as well as in that of human liberty.

WAR MEDICINE

The American Red Cross in France by founding the Research Society, in cooperation with the American Expeditionary Forces, has established a high grade medical school for army medical officers — that is, if Dr. Senn was correct in his estimate of the functions of medical societies. In the *Medical Bulletin* the Red Cross has further supplied the American Army surgeons with a "text-book" on the medicine, surgery, and hygiene of the war, which, if studied, and the knowledge contained in it applied, will aid materially in reducing the non-effective rate from wounds and illness among our soldiers.

Major Alexander Lambert, Medical Advisor of the American Red Cross in France, in announcing the organization of the Research Society and the establishment of the *Medical Bulletin*, stated their aims as follows[1]: "First, to encourage periodic meetings of the men concerned; second, to make available the reports of the latest methods of treatment for war injuries and diseases, by means of a publication. In order to provide for meetings it seems advisable to found a Research Society to meet once a month in Paris, thus per-

1. *Medical Bulletin*, Vol. I, No. 1, November, 1917.

mitting men engaged in scientific investigation to exchange views. To review the medical literature, a journal has been started: it will contain abstracts of papers read at the monthly meetings of the society; and also of articles appearing in the French, English, and American journals. It will be issued monthly, and will be available for the physicians and surgeons with the American Army in France, and for those of our Allies who may find it helpful."

With the hope of increasing the scope and usefulness of its medical publication, the Red Cross, through the courtesy of Brigadier-General Ireland, Chief Surgeon of the American Expeditionary Forces, has secured the services of Major Seale Harris, M. R. C., as Editor-in-Chief. Major Harris, acting also as Secretary of the Research Society, will thus relieve Major Kenneth Taylor, M. R. C., whose faithful and indefatigable services have made possible the success of both the Research Society and the *Medical Bulletin*: and so enable Major Taylor to devote his time exclusively to the important research work which is being done under his direction at the Goelet Fund and Red Cross Laboratories. Major Taylor, however, has been made Honorary Secretary, and remains as an active member of the Research Committee. Dr. E. Bradlee Watson, who has acted as Managing Editor of the *Medical Bulletin* from the start, will continue to serve in that capacity. The endeavor will be made to render the *Bulletin* of maximum usefulness to the rapidly increasing Medical Corps of the American Expeditionary Forces.

There can be no question but that the funds spent by the Red Cross in publishing the *Medical Bulletin* have been wisely invested, because it is fulfilling a distinctive mission in a field that needs to be covered; besides, it is the only medical periodical published for the American Expeditionary Forces. This medical monthly of the Red Cross is not a medical journal in a strict sense, because it does not publish articles, and many other features of a medical journal are lacking in its pages. It has, however, one function of a journal, in that it makes the effort to disseminate recent medical knowledge to a large number of physicians.

It has been thought by some that the title *Medical Bulletin*

does not fittingly describe the functions of this publication and since the words " War Medicine, Surgery, and Hygiene " — originally carried as a sub-title on the front page of the *Medical Bulletin* — seemed to cover the field intended for the monthly medical publication of the Red Cross, it was decided to change the name; and the last number was published as *War Medicine, Surgery, and Hygiene*. After one issue it was further suggested that since the publication will be called by the short title, *War Medicine*; and since the word " medicine " really embraces every field of endeavor in which the American physicians in France are engaged, it has been decided to drop the words " Surgery and Hygiene ". Therefore *War Medicine* will be the title beginning with this number.

It will also be observed that in this number there are 144 pages instead of 64 as in former issues, and a department of Editorial Comments has been added. Circulars and bulletins of interest to medical officers, because they are sent out by the Chief Surgeon of the American Expeditionary Forces, will also be published in *War Medicine*, and other improvements are contemplated; but in general, the policy will be adhered to which, from the first number, made the *Medical Bulletin* a marked success.

Since it publishes resumés, and sometimes the entire text, of papers and addresses that are presented before the Research Society, *War Medicine* carries a message of very great importance to the thousands of American physicians who are beginning to have actual experience in war surgery, and who are dealing with the problems in medicine and hygiene that are incident to the movement of large bodies of troops. There have been regrettable delays in getting this valuable material published and distributed. It is hoped, however, that when the services of a medical reporter, who has been cabled for, have been secured, the proceedings of the Research Society may be published and therefore be made available to medical officers within three or four weeks after the meetings.

The prompt publication of anything, however, in a country at war is extremely difficult. The printing industry in France

has suffered as much as have many others — publishers say more, because type-setters and other experienced skilled laborers are very scarce. The staff of *War Medicine* at this time is limited, and there have been delays on account of the censorship. There have also been difficulties in the distribution of the *Medical Bulletin* since the space on a railway train required to carry a sack of mail can be utilized to transport a soldier. But all of these problems are being attacked and it is hoped that after one or two more issues, *War Medicine* may be published promptly in the early part of each month.

The American Red Cross in France desires every medical officer in the American Expeditionary Forces to receive a copy of *War Medicine*; a large number of copies are sent to the Surgeon General's office in Washington for the medical officers in training in the United States: and a liberal supply is distributed to the medical officers of the Allied Armies. *War Medicine*, therefore, has a wide distribution and it hopes to disseminate medical knowledge which, if applied, will reduce the non-effective rates in our army, thus helping to win the war.

" To err is human ", and errors in policy and in the typographical work of *War Medicine* will surely occur; but the effort will be made to make as few mistakes as possible, and to profit by them when they occur. Criticism is invited, and suggestions offered to make *War Medicine* more helpful to medical officers will be appreciated. It is published with the idea of serving the American physicians who have made sacrifices in order to perform a patriotic duty for their country: and if it can be regarded as one of the up-to-date " text-books " read by them, and the knowledge thus acquired be used to increase the efficiency of the Medical Department of the American Expeditionary Forces, the mission of the medical publication of the American Red Cross in France will have been fulfilled.

WAR MEDICINE ABSTRACTS

Information received from medical officers leads us to believe that the abstracts of original articles on war subjects published in the *Medical Bulletin* have made available to them a great deal of valuable material that has been helpful in their work of treating the sick and wounded soldiers of the A. E. F.

This review of the literature on subjects pertaining to the medicine, surgery, and hygiene of the war will continue to be an important feature of *War Medicine*.

It is not possible to publish an abstract of every valuable article appearing in the current medical literature of the war. Our effort, therefore, will be to select and review the most important contributions on these topics. These abstracts are not intended to be critical, but are supposed to present, impartially, the views of the authors of original articles, leaving to the reader the privilege of estimating for himself the value of the ideas contained in them.

The physicians with the American Expeditionary Forces have not access to medical libraries where they can get the journal containing any article which they see listed or reviewed; and on account of the delays and difficulties in transporting second-class mail, if they get medical journals at all, it is sometimes months after they are published; *War Medicine* is, therefore, the only medical publication which many receive. For this reason an effort is made to publish full abstracts, giving the essentials of the articles reviewed so that the complete articles will not be necessary, in most cases at least, to enable the reader to get the new and important facts brought out by the authors. However, if a medical officer desires to have the original of any article that is abstracted in *War Medicine*, the journal containing it will be sent him if he makes application to the Editor — provided, of course, that it has not already been sent to some one before the request is received. The Red Cross is establishing a Medical Information Bureau in connection with *War Medicine*, which, when organized, will be in a position to furnish any medical officer with all the literature available on any subject.

The abstracts published in *War Medicine* are not entirely

the work of the editorial staff. Many of them have been contributed by a number of officers, who have voluntarily sent in reviews of what they considered important articles. For instance, in this number there are published a number of abstracts that were prepared by an American neurologist of the Medical Reserve Corps on duty in England; and a surgical team which happened to be in Paris during a lull at the Front, came to the A. R. C. Library and abstracted a number of surgical articles. While *War Medicine* is published by the American Red Cross in France it is for the American Expeditionary Forces; and American medical officers should feel that it is *their* medical publication, and that they can help make it of greater value to their medical compatriots by contributing abstracts of important articles that they read, or by making suggestions as to how *War Medicine* may be made of greater usefulness to them.

Time is an important element in giving to the medical profession the advances in medicine and surgery during the war; and American surgeons, when they have anything of value to publish, may get an abstract to their confreres through *War Medicine* several months before the original article could be published in a medical journal and returned to France; it is therefore suggested that, when they send to the Chief Surgeon the manuscripts of original articles to be published in medical journals, they also prepare and send abstracts giving the essential facts contained in them.

The Chief Surgeon of the A. E. F. is interested in having the medical officers receive the latest and best literature on all subjects pertaining to war medicine; and he has agreed to allow us to publish in *War Medicine* abstracts or preliminary notes of approved articles written by A. E. F. medical officers, which will later appear in medical journals. In publishing abstracts of articles not yet published, the title of the paper, with the author's name, will be given; and a note added stating that it is an abstract of, or a preliminary note on, an original article, the full text of which will appear later in a medical journal.

The heads of the professional services in the A. E. F. will be requested to designate medical officers to abstract the ar-

ticles relating to the war that appear in certain journals. Since abstracts come from many sources and represent the collective effort of a large number of medical officers of the A. E. F., the names of the reviewers will not be published.

Many abstracts published in *War Medicine* no doubt seem elementary, and the information contained in them may not be new to the specialists in various lines; but it should be remembered that this publication of the Red Cross is intended especially for the medical officers who may not have access to any other medical publications, and who must treat all diseases, and wounds of every kind, that come to them. It is hoped, however, that each number will contain something of interest to every physician, surgeon, and specialist with the American Army in France.

CIRCULARS AND BULLETINS FROM THE OFFICE OF THE CHIEF SURGEON

Medical officers with the American Expeditionary Forces in France are not only interested in the individual work that they are doing, but they feel a pride in what has been accomplished, and in what is at present being done by the Medical Department of which they are a part. They have the greatest respect for, and confidence in, the ability and judgment of the Chief Surgeon and his Staff. They know that whatever is sent out from the Chief Surgeon's Office has been carefully considered by men of unusual ability and with long experience in military surgery; and that the circulars, bulletins, and reports that are issued from Medical Headquarters are not only an official expression of the policies which should guide the work of every medical officer in France, but that they represent the best medical thought on the subjects with which they deal.

Beginning with this issue, *War Medicine* will publish each month extracts from the official circulars and bulletins that are sent out from the office of the Chief Surgeon, and it is believed that this department will prove an addition of real value to those whom we desire to serve. These circulars and bulletins are sent to the commanding officers of hospitals, to all division surgeons, and to the heads of other medical units

for distribution, but many medical officers do not receive them. Whether they receive them or not, every medical officer desires to have these important documents in a permanent form, and properly indexed, so that they may be referred to as the need for official advice is felt. This is accomplished by publishing them in *War Medicine*.

Of course, if any circular or bulletin should contain information that could be regarded as confidential, or of such nature that it would give aid to the enemy it would not be published. Likewise those which deal with small groups of men and which would not be of general interest will be omitted.

In this number are published extracts from recent circulars, sent out from the Chief Surgeon's Office, dealing with a number of matters pertaining to administration in the Medical Department of the A. E. F., in which all medical officers are interested; but special attention is called to the plan of organization of the professional services with the American Expeditionary Forces.

The Chief Surgeon makes no distinction between the Regular Medical Corps and the Medical Reserve Corps; but he has wisely placed the medical officers who have had long experience with military administration in executive positions, and has placed the care and treatment of the sick and wounded soldiers very largely in the hands of physicians and surgeons who have had large clinical experience. This circular outlines very definitely a plan for an organization in which the best clinical medical talent from America is utilized. It has been in operation for some time, and it is announced, because the Chief Surgeon knows that it makes for the highest degree of efficiency in safeguarding the health and lives of our soldiers.

The Bulletins from the Chief Surgeon's Office deal with disease. They always contain a great deal of interesting data, expressed in very attractive style; and much other important information that all medical officers should have. The notes in these Bulletins on infectious diseases, and preventive medicine generally, are intensely practical; and they place in the hands of medical officers first-hand facts regarding

military hygiene and sanitation, as applied to conditions in the A. E. F., that should be helpful to them in their efforts to reduce the morbidity and mortality rates in our Army.

MEDICAL INTELLIGENCE DEPARTMENT

In furtherance of his plans for increasing the medical opportunities of American physicians in France, Major Alexander Lambert, Medical Adviser of the A. R. C. in France, has established two bureaus. One of these — that in his office at 12 Place Vendôme — aims to give to visiting medical men full information as to the medical and surgical work in Paris, not alone in direct connection with the army and its medico-surgical problems, but especially the research work in every department that is being done by French physicians. This bureau has been put in charge of Dr. D. T. Boulanger who has for some years been doing research work in America in connexion with X-ray and radium. Dr. Boulanger will not only be able to give to physicians full data about all clinics, but will endeavor to facilitate the opportunity of making full use of the clinics by personally conducting those unfamiliar with Paris, so that a minimum of time may be lost by men whose visits are short.

The other bureau, under the charge of Dr. Thomas H. Halsted, at 9 Rue du Mont-Thabor, is designed to bring the medical and surgical personnel of the A. E. F. into closer relation to the advances in medicine, so that any medical officer in the army anywhere in France can write or telegraph to this office for the last word on any subject and have it sent out at once.

In the meantime a force of workers is abstracting and filing articles on war subjects for library and circulating purposes so as to conserve the time of medical men in keeping abreast of all important advances.

WOUNDS OF THE CHEST

There has not been published a more authoritative treatise on war wounds of the chest than the report of a session of the Research Society which appears in this number of *War*

Medicine. All phases of the subject were not dealt with in this symposium, but those considered were discussed by surgeons of high attainments who spoke from a large experience with the French and British Armies in treating wounds of the chest.

Major General Sir John Rose Bradford discussed the diagnosis, dealing particularly with the methods for determining the anatomical conditions present, and for deciding the very important question of the presence or absence of infection in wounds of the chest.

The following subjects were discussed by other speakers: "Wounds of the Chest", by Colonel A. F. Soltau; "Operative Results of Early Surgical Treatment", by Médecin-Major Pierre Duval; "The Treatment and Management of Psychoneuroses", by Lieutenant-Colonel Gordon Holmes; "Operative Treatment in Chest Surgery", by Major A. L. Lockwood; "Removal of Foreign Bodies from the Chest under Fluoroscope", by Dr. Petit de la Villéon; and "Secondary Surgical Treatment of Chest Wounds", by Professor Tuffier.

When to Operate

The discussion brought out an interesting difference of opinion as to when and where to operate in wounds of the chest. Colonel Soltau contended that many cases would recover without operation, which should not be performed without definite indications; while Major Lockwood and Médecin-Major Duval urged immediate operation. It developed in the discussion that the statistics show about the same results from both methods of treatment.

The question of immediate operation in chest wounds would seem to depend upon a number of considerations, involving the skill and experience of the surgeon, the facilities for operating, and the condition of the patient. The surgeons who have had large experience, and have therefore acquired great skill in operating upon lung wounds, will probably get the best results by the immediate operation, if the patient's condition warrants it; while surgeons of limited experience, and uncertain technic, will save more patients by waiting

until there are definite indications for an operation.

A consideration in time of battle, when a great many wounded have to be treated, is whether or not a surgeon shall devote an hour or more to a man who is very seriously wounded, with the chances perhaps against recovery, if in doing so he must delay treatment of a number of other men who have slight wounds which would not become infected if they were looked after immediately, but which may develop gas gangrene, or other infection, if allowed to go a few hours without the first dressing. From the military viewpoint it is very important for the slightly wounded man to get back to the line as soon as possible, but for that reason alone the seriously wounded man must not be neglected.

These are questions for each individual surgeon to decide; but he can get facts that will help him in dealing with wounds of the chest, if he will read the reports of the Research Society Meeting.

WAR NEUROSES

The discussion on "War Neuroses" at the Meeting of the Research Society, June 29, was participated in by a number of French and British neurologists who related their experiences in dealing with the nervous cases that have occurred in the Allied Armies during the past four years. These men have had the opportunity of trying out the different methods of handling the war neuroses; and having had sufficient time to observe the end result of various plans of treatment, their conclusions are of great value.

An important fact brought out in the discussion was that the medical officer at the front is the man who is often responsible for many suggestions that tend to make chronic hospital patients of neurotic and fatigued soldiers, who, if properly treated, would never go further back from the line than the regimental hospital. It is therefore essential that regimental medical officers, as well as the other medical men with the American Expeditionary Forces, should be informed regarding the diagnosis and treatment of the psychoneuroses that may occur in soldiers.

In this symposium on " War Neuroses ", the British Army was represented by Major Foster Kennedy, R. A. M. C., F. R. S. Edin., who discussed " The Nature of Nervousness in Soldiers ", and by Lieut-Colonel Gordon Holmes, R. A. M. C., whose subject was " The Treatment and Management of Psychoneuroses as they Appear in a Combatant Army." The French viewpoint was expressed by Professor Dupré, who discussed " The Emotions and the War "; Professor G. Roussy, who dealt with the " Psychoneurological Disturbances Affecting the Limbs "; Professor Laignel-Lavastine, whose subject was " Observations and Diagnosis and Treatment of War Neuroses "; and Professor Marie, who talked on " Organic Causes of Psychic Disturbances ".

The Medical Department of the American Expeditionary Forces was represented by Lieut-Colonel Thomas Salmon, Chief Consultant in Psychoneurology, and Major J. H. W. Rhein, M. R. C., also connected with the Neurological Division. Lieut-Col. Salmon discussed " American Plans for Dealing with War Neuroses ", calling attention to what has been done, and what will be done, by the Division of Neurology of the American Expeditionary Forces; and Major Rhein told of the methods that have been employed in the United States to eliminate neurotics and psychasthenics from the American Army.

About two hundred American physicians had the privilege of hearing the discussions on " War Neuroses ", but every medical officer with the American Expeditionary Forces will have the opportunity of reading in *War Medicine* the reports of this important discussion of the Research Society.

No More Shell-Shock

There were some slight differences of opinions among the neurologists who participated in the discussion on " War Neuroses " at the meeting of the Research Society; but all agreed that there is no place in medical nomenclature for " shell-shock ". At the beginning of the war, there were many medical articles published under the title of " shell-shock " which gave to medical men a wrong conception of the condition. The public was fed on a lot of misinforma-

tion, and very soon " shell-shock " was regarded among the laity as a new and mysterious condition resulting from the concussion incident to the use of high explosives in modern warfare. Soldiers who were supposed to be suffering from " shell-shock ", returning to their homes, or to base hospitals, were sought out by curiosity-seekers, and were given a lot of sympathy and attention, which only exaggerated their symptoms.

Soon it was found that many soldiers who were in positions to suffer the greatest concussion from heavy artillery or bursting shells were not affected. It was then realized that it was the men of neurotic type, and those who were excessively fatigued, who, when the Army surgeon made the snapshot diagnosis " shell-shock ", spent months in base or neurological hospitals because of the suggestion and the patient's misconception of his true condition. Then it was realized by the French and British neurologists that " shell-shock " in war was the same thing as the traumatic neuroses in civil life.

The term has been given up and the soldiers of the French and British Armies are now ashamed to admit that they have " shell-shock "; because, as one neurologist said, " the good soldier, except when excessively fatigued, does not have " shell-shock ", and then the symptoms are of short duration and subside after a brief rest ". The so-called " shell-shock " cases are now treated at the Front by the British and French Army surgeons, and they usually return to duty in a few days.

It is well for American medical officers to get the viewpoint of our French and British confreres who have had a large experience with the war neuroses, and under no circumstances to make the diagnosis of " shell-shock ". If the surgeon has not the time to make a thorough examination for an accurate diagnosis, he should note the symptoms on the patient's history card; and send him to the base without a diagnosis. He should never suggest to the nervous patient that he may have " shell-shock " or any other condition that could keep him back of the line indefinitely; but should always encourage him, making suggestions of improvement, rather

than those which may place him on the non-effective list for a long time, or even permanently.

There is now no excuse for a diagnosis of "shell-shock", and it can no longer be used to cover up haste or ignorance in diagnosing psychoneuroses among soldiers. "Shell-shock", like other mistakes and fallacies, should and will pass into "innocuous desuetude".

THE GOOD SURGEON: THE MOST IMPORTANT FACTOR IN THE TREATMENT OF WAR WOUNDS

The surgeons and pathologists, who for four years have intensively studied war wounds, have formulated many views — many apparently contradictory views — such as, various chemical agents against no chemical agent; moist dressing against dry; heat against cold; frequent dressings against infrequent, and against both, no dressings; sunlight and electric light against occlusion; immersion versus hot air; bacteriologic control against clinical judgment; vaccines, toxins, and foreign proteins against normal reaction; wound inoculation of harmless organisms against wound sterilization; isotonic against hypertonic solutions; paste competing with paste — *bip* against *ip*, *sap* against both, and *chromatic* pastes against all. Does not the intensive study of war wounds for a short period equal and recapitulate the more leisurely study during the thirty years since Lister brought out the carbolic spray? And is there not slowly emerging from the present conflict of views the one and identical agent of successful surgery that emerged from the post-Listerian period — *the good surgeon*?

In civil surgery in America what was the agency by which mastery was achieved over appendicitis, cholecystitis, tubal infection, adenitis? What agent succeeded best in resection of the intestine; in gastroenterostomy; in suppurating stone in the kidney; in resection of the stomach; in infection of the subcutaneous tissue? What agencies achieved survival? But *one* — the sound surgeon, who always creates opportunity. Is it possible that in these four intense years of war surgery, in which there has been accumulated more experience in traum-

atic surgery than during the past 30 years, we have traveled around the same circle as in civil surgery and have again found the same *surgeon*?

By sound surgery we mean the assumption of complete inclusive responsibility for every item that enters into the result; the consideration of the wound as well as the patient; the development of an ability to read the wound as well as the man aright. It means quick, innocuous, timely intervention; it means seeing clearly the to-morrow of the wound; it means no intervention unless there is to be a net gain; it means a sharp knife, a good anesthetic, a painless innocuous dessing; it means as much respect for the tissues of the anesthetized man as for the unanesthetized man: it means a training in judgment that unerringly tells when to cut, how far to cut, when to quit cutting. It plays all the defenses and reparative forces of the patient. Good surgery is the exponent of no single method. It recognizes the anatomical and environmental situation in which chemical and physical agencies are useful. Good surgery exploits physiologic rest and fluids and sleep; gives little pain. Good surgery evokes confidence; and confidence begets rest; and rest begets restoration. Good surgery, then, makes use of antiseptics and physical forces, just as it uses incisions, counter-drainage, revisions, skin-grafting, blood-transfusion. Good surgery does not substitute an easy formula for its principles; above all, it always is dissatisfied with its work and is open to suggestion.

What can the good surgeon accomplish in war with wounds, with good opportunity but no antiseptics? Without antiseptics he can close by primary union a higher percentage of contaminated wounds than he can with antiseptics; he is able to remove damaged tissue with such accuracy that the natural defenses of the revised wound become its best antiseptic; he closes penetrated knee joints more securely without than with antiseptics; he closes penetrated skulls without, better than with, antiseptics; he operates on perforated intestines more successfully without than with antiseptics; he clears up foul and infected superficial wounds as well without as with antiseptics; he meets gas gangrene with the timely use of the knife as well without as with chemical agents. He closes

healthy superficial wounds with early suture tied lightly; healthy wounds that cannot be closed by suture he closes by skin grafting, both as a healing and as a bacteriocidal policy; he closes fecal and urinary fistulae without antiseptics.

On the other hand, he realizes equally that in compound fractures with or without bone infection, in deep, recessed wounds, in pyocyaneus infection, in many other wounds, antiseptics may have great advantage, and he uses them and uses them well. In certain phases of a wound, he would use Carrel-Dakin; in another, acetic acid; in another, hot pack; in another, incision — he makes physiologic incisions today to avoid the tissue tension of tomorrow; — in another, a transfusion; in another, sunlight or electric light; in another, continuous alcohol to make a scar covering.

In the rush of a great battle, he would incise for drainage, and in addition he would make " physiologic incisions " to avoid tension that is sure to follow the next day from the inevitable infection.

But in quiet times, he would dissect out with macroscopic exactness every atom of devitalized tissue. He reads accurately not only the wound, but the patient; not only the patient, but the military situation; not only the military situation, but the condition of the infecting soil, the state of transport, his surgical assistance, and the type of nursing care — that is, he weighs accurately his chances for success. Therefore, the army medical service and the wounded man pin their hope and their faith first, last, and always to the one agency of wound treatment that in civilian surgery emerged clearly from the confusion of the Listerian period; is emerging clearly from the confusion of the four years of military surgery — *the sane, sound surgeon.*

What our army needs beyond all else is an adequate number of sound surgeons; and these men should be given every opportunity for their development. The next most important factor is — not chemical agents, but a transport so organized that the sound surgeon comes in contact with his patient at the earliest moment; and that there is provided for *each wounded man requiring operation at the front* for an average period of half an hour, a table and a good surgeon.

CIRCULARS, BULLETINS AND REPORTS

ISSUED FROM THE OFFICE OF THE CHIEF SURGEON, OF THE AMERICAN EXPEDITIONARY FORCES IN FRANCE.

Under this heading will be published extracts from circulars and bulletins issued by the Chief Surgeon of the Medical Department of the American Expeditionary Forces in France. It is believed that these will be of general interest and value to medical officers.

EXTRACTS FROM C. S. O. CIRCULARS

FOOD AND NUTRITION SECTION.

Announcement is made of the organization of a Food and Nutrition Section in the Division of Sanitation, Office of the Chief Surgeon, A. E. F. This Section will be under the supervision of the Director of Laboratories and Infectious Diseases, and its functions shall be to inspect, investigate, and make recommendations concerning those factors directly affecting the nutrition of troops of the American Expeditionary Forces. The Section is authorized to advise concerning the suitability of rations and dietaries, and all changes or substitutions proposed in rations and dietaries for troops, hospitals, or prison camps; and in cooperation with the Quartermaster Department, the Section will devise and propose measures for the observation of food.

SURGICAL OPERATIONS.

a) Surgical operations of election for chronic conditions which existed before the war and which do not incapacitate for the performance of ordinary duty, will not, as a rule, be performed during periods of military activity, and will only be done in well equipped base or camp hospitals of the A. E. F.

b) Hernias should be operated upon subject to the foregoing restrictions, bearing in mind military convenience and the extent of present or threatened disability.

c) Operations for varicocele should, as a rule, not be performed at all.

d) Removal of tonsils is not to be done, except when marked obstruction to respiration exists, or when they are a source of infection in a systemic disease.

e) Hemorrhoids should be operated upon subject to the restrictions of Paragraph *a*.

f) Special instructions for the handling of orthopedic patients are in course of preparation.

Proper Handling and Disposition of Slightly Wounded Men.

Attention is directed to the importance of early proper handling and disposition of slightly wounded men in all hospital formations. While the handling of the seriously wounded usually entails a greater exercise of technical skill, the claims of the slightly wounded for equal attention may be overlooked. It must be borne in mind that a neglected or improperly treated slight wound may have serious consequences and cause prolonged hospitalization. Slightly wounded men form the greatest military asset among all those admitted to hospitals, in that their early return to duty can be looked for if they are properly treated. The tendency in some hospitals is to delegate the care and treatment of slightly wounded men to the medical officers young in experience and skill in surgery.

Without deflecting the full measure of attention to be given to serious cases, surgical personnel at hospitals should be so assigned as to bring skill and attention to bear upon slightly wounded men equal to that given to more serious cases, carrying into effect that principle of military surgery which contemplates the greatest good to the greatest number.

Etiquette of Visits to French Hospitals.

Correspondence recently received from the French Service de Santé indicates that in certain cases medical officers of the A. E. F. have visited American patients in French hospitals without first calling on the Médecin Chef of the hospital to get his permission.

It is a military principle which governs in all armies, to which the French attach much importance, that an officer should not go into any military organization for the purpose of inspecting without first calling on the Commanding Officer of that organization to get his permission. It is very desirable when the visit is one of inspection, and not merely a personal visit to individual patients, that the Médecin Chef or an officer designated by him should accompany the American medical officer. This is an important matter of military administration, as well as military courtesy, which all medical officers should be careful to observe.

Hospitalization and Evacuation of Cases of Pulmonary Tuberculosis and Suspected Pulmonary Tuberculosis.

3. Collecting and observation centers have been established at various hospitals for cases of pulmonary tuberculosis and suspected pulmonary tuberculosis which may occur in the A. E. F.

b) In future the diagnosis "Pulmonary Tuberculosis" should be limited to cases in which tubercle bacilli are found in the sputa. Cases in which this diagnosis has been established should be evacuated to Base Hospitals, which are designated as collecting centers for these cases during the period preceding their evacuation to the United States.

c) Cases of suspected tuberculosis should be diagnosed "Tuberculosis Observation". Such cases should be evacuated to Base Hospitals, which are designated for the purpose.

Organization of Professional Services Medical Department, A. E. F.

There has been appointed, by G. O. 88, G. H. Q., A. E. F., June 6, 1918, for the Medical Department:

A Director of Professional Services, A. E. F.

A Chief Consultant, Surgical Service, A. E. F.

A Chief Consultant, Medical Service, A. E. F.

Senior Consultants in special sub-divisions of surgery and medicine.

Division Specialists, and

Consultants for base hospital centers and other formations.

In order to utilize the professional services of the Specialists of the Medical Department, A. E. F., in a manner which will best facilitate complete co-ordination between forces from front to rear, the following instructions are issued:

Director of Professional Services.

The Director of Professional Services, under the Hospitalization Division of the Office of the Chief Surgeon, will supervise the professional activities of the Medical Department, A. E. F., and co-ordinate the work of the Consultants and Specialists of the Medical Department.

Chief Consultants.

The Chief Consultant, Surgical Service, will supervise the professional surgical sub-divisions in the A. E. F. He will organize and co-ordinate these divisions in a manner which will permit him to anticipate, as far as possible, necessary changes in personnel so that timely request for such changes may be made. He is responsible for the proper formations of the surgical teams in the A. E. F., and those attached to the units of the Allies, and he will keep lists and records of the teams whereby the amount and the efficiency of their work may be checked. For this purpose, he will require

from each surgical team suitable monthly reports of the number of operations performed and the results obtained. He will make such recommendations as he may deem necessary for inspections as to technical procedure and instruction, details of operating surgeons, details to surgical teams, and appointment of Surgical Consultants in the A. E F.

The Chief Consultant, Medical Service, will supervise all medical subdivisions in the A. E. F., and will make such recommendations as may be necessary to insure a high professional standard and complete harmony among his assistants functioning in all formations.

Senior Consultants.

Under supervision of the Director of Professional Services and the Chief Consultants in surgery and in medicine, Senior Consultants of the special sub-divisions of medicine and surgery will coordinate professional activities relating to their specialities.

They will make such recommendations to the Chief Consultant as are deemed necessary for the instruction of consultants and specialists in divisional and other army formations, in order that prompt execution of directions relative to professional subjects may be assured.

Senior Divisional Consultants.

One Senior Medical and one Senior Surgical Consultant will be assigned to all tactical organizations which are the equivalent of one Army Corps, and consultants will be appointed in such numbers as may be necessary to assist the Senior Division Consultants. Senior Division Consultants will hereafter be responsible for the duties now being performed by the Division Consultants.

Senior Divisional Surgical Consultants.

The Senior Divisional Surgical Consultant, under the Chief Surgical Consultant, A. E. F., will be expected to make at frequent intervals a complete survey of the professional instruction, surgical technique, and the methods of treatment in use in the Division, and he will render from time to time such reports and recommendations to the Chief Surgical Consultant, A. E. F., as will promote a free interchange of suggestions and the most effective coordination with the other professional services.

He will supervise the professional activities of all consultants, operating teams, and operating surgeons attached to his division, in a manner which will permit him to familiarize himself with the individual capabilities of the men, with a view to selection, based

on observation of those likely to adapt themselves to modern military surgical team formations rather than individual work.

He will be responsible for the organization, efficiency, and distribution of surgical teams, and he will make such recommendations to the Chief Surgical Consultant, A. E. F., as will facilitate the formation of sufficient teams to meet the constantly increasing demands incident to the arrival in France of new formations.

The Senior Divisional Consultant will also coordinate the activities of the professional personnel in his division in a manner that will be conducive to high surgical standards, and elimination or reassignment to other duties of those who fall below the requirements. He will spare no effort to promote professional harmony and unity of treatment in the divisional formations.

Senior Divisional Medical Consultants.

The Senior Divisional Medical Consultant will, by frequent inspections, satisfy himself that various classes of patients suffering from medical disabilities are receiving the best and most advanced treatment possible. He will report from time to time to the Chief Medical Consultant, A. E. F., the results of his inspections, and make suggestions looking toward the perfection of the Medical Service of the A. E. F.

Divisional Surgical Consultants.

The Divisional Surgical Consultant will, under the Senior Divisional Surgical Consultant, supervise the immediate surgical activities of operating teams within his division. During mobile or semi-mobile warfare, when established evacuation hospitals are absent, the operative work, in formations for non-transportable cases, will be handled, when practicable, by surgical teams functioning under the supervision of the Senior Divisional Surgical Consultant, or his assistant.

Divisional Medical Consultants.

Divisional Medical Consultants will supervise the immediate medical activities in the Division to which they may be assigned.

Relations of the Divisional Surgeon to Senior Divisional Surgical Consultants and Consultants Functioning Divisions.

The many details of organization and administration which will devolve upon the Division Surgeon, in the care of sick and wounded and their evacuation, will so tax his time and ability that it is not believed that the supervision of the technical surgical work, which

at times must be done in division formations, should be added to his already serious responsibilities; therefore, the direction and supervision of the purely operative side of the work done in divisional formations is placed upon the Senior Divisional Surgical Consultant, or his assistants.

The Division Surgeon will supply the necessary hospital facilities, supplies, and personnel other than those forming teams. He will spare no effort in technical cooperation which may promote harmony of action between the professional services with the fighting forces, from the front to the rear.

Division Specialists.

One Orthopedic Surgeon, one Urologist, and one Neuro-psychiatrist will be appointed from the division sanitary personnel, and, under the direction of the divisional Chief Surgeon, they will perform the duties pertaining to their several specialities, in addition to the other duties of medical officers which may be required of them by the exigencies of the service.

Consultants for Base and Hospital Centers.

Upon the recommendation of the Chief Surgical and Medical Consultants, A. E. F., there will be appointed for Base Hospital Groups such consultants as may be necessary from time to time. These consultants will at all times be within reach of the Base Hospital Group to which they are attached.

The organization of Base and General Hospitals and other hospitals, as far as practicable, will be made on the basis of three services: Surgical, Medical, and Laboratory, each composed of sections coordinated through a Chief of Service designated by the Commanding Officer, who may be selected from any section, ability and experience being the determining factors. In detail, the professional services of hospitals are divided according to the following outline:

ORGANIZATION OF BASE AND GENERAL HOSPITALS

Surgical Services

Chief of Services:

1st Section. — General Surgery. { General. Chest. Abdomen. Fractures.

2nd Section. — Orthopedic Surgery.

3rd Section. — Urology.

4th Section. — Head Surgery . . { Brain (also Neurology.) / Ear, Nose and Throat. / Eye. / Oral (Face and Mouth).

5th Section. — Roentgenology.
6th Section. — Dentistry.

MEDICAL SERVICES

Chief of Service :

1st Section. — General Medicine.
2nd Section. — Neurology.
3rd Section. — Psychiatry.

LABORATORY SERVICES

Chief of Service :

1st Section. — Pathology.
2nd Section. — Bacteriology and Serology.

A. E. F. — DIRECTOR PROFESSIONAL SERVICES

CHIEF CONSULTANT, SURGICAL SERVICE
CHIEF CONSULTANT, MEDICAL SERVICE

ARMY

Senior Consultant, Surgery, A. E. F.

1. General Surgery.
1. Orthopedic Surgery.
1. Urology and Dermatology.
1. Eye.
1. Ear, Nose and Throat.
1. Neurological Surgery.
1. Maxillo-facial Surgery.
1. Roentgenology.
1. Research.
1. Formations, equivalent to an Army Corps.
4. Consultants (Assistants to division senior consultants).

Senior Consultant, Medicine, A. E. F.

1. General Medicine.
1. Neuro-psychiatry.
1. Formations, equivalent to an Army Corps.
2. Consultants (Assistants to division senior consultants).
(Others as required).

ARMY CORPS

DIVISION

SPECIALISTS. EACH TACTICAL DIVISION

A Part of Division Sanitary Personnel, Tables of Organization.

Surgery :

1. Orthopedic Surgery.
1. Urology.

Medicine :

1. Neuro-psychiatrist.

HOSPITAL CENTERS

Consultants, Medicine :

Each Hospital Center, S. O. S. :
1. General Medicine.
1. Neuro-psychiatric.
(Others as required).

Consultants, Surgery :

Each Hospital Center, S. O. S.
1. General Surgery.
1. Orthopedic Surgery.
1. Urology and Dermatology.
1. Eye.
1. Neurological Surgery.
1. Ear, Nose, and Throat.
1. Maxillo-facial Surgery.
1. Roentgenology.

S. O. S. — SPECIALISTS. — EACH BASE HOSPITAL

Part of Unit Personnel.

Surgery (as needed) :

General Surgery.
Orthopedic Surgery.
Urology and Dermatology.
Neurological Surgery.
Eye.
Ear, Nose, and Throat.
Roentgenology.
Maxillo-facial Surgery.

Medicine (as needed

General Medicine.
Psychiatry.
(Others as required.)

EXTRACTS FROM WEEKLY BULLETIN OF DISEASE

How to handle Diphtheria Carriers and Contacts When a Division Moves.

At present, when a division leaves a training area the camp hospitals are evacuated, carriers (whether of diphtheria or meningitis held until freed from the infecting organism, must then be evacuated to a Base Hospital. The contacts of infectious diseases held for observation during the incubation period are taken along by the division with very imperfect provision for segregation. This has resulted in the development of a considerable number of secondary cases of various diseases and the spread of infection to previously uninfected units within a division. If the contacts, like the carriers, were sent to Base Hospitals they would then under existing conditions be sent from there to the replacement division of the corps and redistributed perhaps to some other division or unit of the corps.

It has been suggested that when a division leaves its training area a medical officer and perhaps a cook be left behind in the camp hospital with supplies sufficient for two weeks, and that contacts of

recent infectious diseases, whose period of incubation is not yet over, be left under command of this medical officer for the remainder of that period. This would never be longer than two weeks, at the end of which time the final evacuation of the camp hospital could be completed and the contacts forwarded to their division in the line.

Several of the Division Surgeons have expressed their approval of this suggestion and, since there is a permanent personnel provided for camp hospitals, it rests with the Division Surgeon to use this method if he wishes to.

The practice in one division has been : " To appoint a surgeon and a small sanitary detachment for service with this detachment, and to leave behind an ambulance or two and the necessary medical equipment to care for the men of the detachment. It seems easier to assign the carriers and contacts, with necessary instructions for isolation, to the detachment left behind, rather than to leave a medical officer, a cook, and supplies in the camp hospital and allow them to fall into the hands of the S. O. S. ".

This procedure also would accomplish the desired results.

From another Division Surgeon comes the comment that, " As contagious contacts are not on the sick report, it would be difficult to have them placed under the command of a medical officer. It is suggested that when a division leaves its area, the contacts be segregated, left behind, and billeted in one locality, care being taken to arrange the billets so that contacts of only one disease are billeted in the same place. An officer of the line should be in command. The necessary cooks and cooking utensils should be provided. A medical officer should also be left with the men for the necessary examinations and medical attendance. Men in this group who develop the disease for which they are segregated should be evacuated to the nearest contagious disease hospital. "

This suggestion certainly meets the need in a simple way and perhaps with advantages over either of the previous plans.

Any method whereby the contacts could be held in the training area until the incubation time has passed and then be forwarded directly to their Division instead of going back to a base hospital and then through the replacement division, would, in our opinion, be satisfactory. There is not only delay in sending these contacts back to replacement divisions but there is danger inasmuch as they come in contact with a new group of men and in this way may act as carriers of disease.

Special Notes on Diphtheria.

In two divisions diphtheria (in the United States, during transportation overseas; in France, in the billeting areas) has been present in such numbers and so continuously as to demand special assistance and attention from the Central Medical Laboratory.

The detection of all diphtheria carriers by culture of noses and throats of entire regiments is impracticable except at the cost of such delay as would neutralize any possible benefits to be expected. When diphtheria is confined to a unit no larger than a battalion, the search for carriers and susceptibles by culture and Schick test may properly cover all members of the command. Such methods, coupled with special attention to the kitchen personnel, the sanitation of billets, ventilation of sleeping quarters, and thorough washing of mess-kits have been successful in bringing epidemics to an end promptly.

When diphtheria appears distributed throughout an entire division, as, for instance, in 56 separate companies of organization in the ... Division, the problem is one of sanitation more than one which can be handled by laboratory methods exclusively. Under these conditions, the following steps are advised: Select for culture and Schick testing all known contacts of each case (sometimes as many as 30-40 may be necessary), i. e., bunk mates and those in any way intimately associated with the patient, in living, eating, working or social relations. Culture kitchen personnel and cooks of the patient's mess. Provide temporarily as much increased floor space per capita for the command as is practicable, resorting to shelter tents if necessary (in woods, when available, in advanced areas where enemy aviation makes tentage undesirable). Wet sweeping and thorough cleanliness of billets. Daily and thorough airing and sunning of bedding. Vigorous police control and discipline for spitting in or about billets, kitchens, and mess huts or sheds. Daily inspection of whole command for early detection of inflamed throats. Special care should be taken to provide *boiling water for washing mess-kits, under the supervision of a non-commissioned officer*. The last 50 or 60 men usually find a luke-warm, turbid fluid to rinse their dishes in. If fuel is lacking to provide *hot water* a generous allowance of warm soapy water must be provided and the dishes rinsed in a mild antiseptic solution.

Regarding Circular 13.

Reports of "suspects" are often received during localized epidemics of diphtheria, scarlet fever, and meningitis, and these are but

rarely followed by confirmation of diagnosis. It is important that, if a "suspect" is later found to be a true case of the disease in question, the case be reported on the day of diagnosis just as if it were a new admission. Only in this way can an accurate record of the number and distribution of cases of the important communicable diseases be kept for the Chief Surgeon.

Hospital Commanding Officers to the Rescue.

The new method of reporting sick and wounded has been in operation since June 15th. It has satisfied every expectation. The office of the Chief Surgeon is equipped with the most modern methods for making use of the information which is received, and it now rests with the hospitals and the medical organizations in the field to take every precaution in making and forwarding reports so that this information can be properly used for the general benefit. The accuracy and promptness, with which the statistical tabulations from Form 22, Daily Report of Casualties and Changes, can be made depends directly upon the pains taken by be Commanding Officers of medical organizations to transmit the information correctly and regularly. The rapid transmission of these reports is all important and the established courier service should be utilized wherever possible.

Effort Syndrome an Acceptable Term.

Since the abbreviation D. A. H., disordered action of the heart, and the three inclusions under this heading in the official nomenclature of the new Sick and Wounded Report (bradycardia, tachycardia, and arythmia) do not correctly express present day clinical facts, the term *effort syndrome* will be accepted as a diagnosis on the Field Medical Card and on daily hospital reports for the condition to which the term D. A. H., has been generally but incorrectly applied.

The condition was well known to military surgeons in the United States during the Civil War as the "irritable heart of soldiers". This condition is a reaction to the stress, fatigue, and emotions incident to active warfare. Many cases occur also after infections such as trench fever and during convalescence after gassing. When suffering from this condition, the characteristic diagnostic points of the *effort syndrome* are complaint of pain in the chest, headache, giddiness, and breathlessness, all of which symptoms are aggravated by any inconsiderable effort. The heart rarely shows extreme slowing or quickening of the rate or irregularity in its rhythm.

The treatment consists in graded exercises, not in prolonged rest

in bed, in encouragement as to early and complete recovery, not in calling attention to cardiac symptoms. The proper place for the treatment of these cases is in the convalescent camps now being established.

Hume in the *Lancet* (April 13, '18. p. 529), in reporting upon 5000 soldiers sent to the base with diagnosis of V. D. H. and D. A. H., says that 8.3 o/o were found to be suffering from easily recognizable diseases, in no way circulatory in origin. Of the other 91.7 o/o of the cases only 55 were cases of organic heart disease. The remaining cases complained chiefly of breathlessness, pain in the chest, palpitation, giddiness and other less easily definable symptoms.

" No matter how the condition may be produced, the rationale of treatment is the same in all cases. The most important factor in all cases is the abolition from the patient's mind of the idea that he has a diseased heart. Good food, undisturbed sleep and outdoor exercise, regulated and under discipline, are the sole factors necessary for the improvement of all types. By this method 50 to 60 o/o can be sent back to their original work after four to five weeks. The remaining 40 to 50 o/o are unable by reason of poor physique, actual disease, or age, to undertake every kind of work and hardship. Apart from those who suffer from actual heart disease or some organic disease of other systems, nearly all are fit for some service in France ".

References to current medical literature : Infectious Jaundice.

The problem of acute infectious jaundice in the United States with summary of experience among the troops of the nations at war in Europe is dealt with in an excellent article by M. H. Neill, Past Asst. Surgeon, U. S. Public Health Service in the Public Health Reports, Vol. 33, No, 19 of May 10, 1918. A full bibliography is appended. This publication can be obtained through the American Red Cross Medical Library, 12, place Vendôme, Paris.

COMMANDING OFFICERS OF BASE HOSPITALS PLEASE NOTE

Tests for Physical Disability.

Pending the establishment of convalescent camps, in order to prevent the return of men to duty before they are fit, patients no longer needing ward treatment should be segregated in convalescent wards in Base Hospitals for physical training under medical

direction. Tests of fitness should precede discharge from hospital to duty. Functional test, even more than physical examinations, are needed to disclose latent circulatory and respiratory defects.

The following note from the President of a Disability Board puts the problem clearly :

" There are appearing before this board a class of cases from the hospitals whose disability has become apparent after discharge from the hospitals, which disability, it appears, is due to the impoverished physical strength of soldiers caused by hospitalization. Recovery from wounds and disease is complete and classification by boards at the hospitals as class " A " is correct when these only are considered; but travel, with its incident marching and other work, reveals a depleted physical condition, and the soldier's unfitness for active service or intensive training. That the soldier's convalescence is retarded and morale impaired by exertion not commensurate with his strength, we believe is possible, and we are of the opinion that the return of the soldier to active service through graduated training based on the individual requirement of the soldier will result in a saving of time and will prevent rehospitalization.

A second class consists of apparently convalescent gassed cases. These cases state they were well on discharge from hospitals, but as a result of the exertion necessitated by travel, shortness of breath has developed. Examination of the chest reveals emphysema accompanied with a tachycardia. It is the opinion of the board that a physical examination of the chest alone will not reveal the soldier's true physical condition and that classification on the chest findings is not entirely reliable. It is believed that classification in these apparently convalescent cases can be made more accurately by examination after carefully supervised exercise. "

Prompt Evacuation of Class " D " Patients Imperative.

On account of the recent rapid increase and the contemplated large additions to our forces in France, it is necessary to exercise the greatest economy in the use of bed space in hospitals. Patients should be returned to duty as soon as their condition warrants such action.

Patients clearly falling under Class " D " should not be held for prolonged observation and study no matter how much professional interest they excite. Prompt action in the disposition of all Class " D " men is not only in the interest of the patients themselves, but will save hospital space and permit a steady flow of evacuables to home ports. Prolonged hospitalization in the Zone

of Operations is to be avoided, since the authorized percentage of bed space in the A. E. F. contemplates final reconstruction and salvage of disabled men in the United States.

Delay in autopsies. The average time period between the death of individuals and the performance of autopsies in the A. E. F. is now 98 hours. In view of the rapid decomposition of dead bodies, particularly when refrigeration is impossible, it is desirable to reduce this delay as far as practicable. Organs and tissues are particularly valuable to the pathologists when they can be inspected and placed in fixation before cellular death has occurred. For fine cell studies, tissues should be fixed as soon after the circulation has ceased as possible.

The Epidemic of Influenza.

This disease which was mentioned previously as "Three Day Fever" is now known to be due to the true Pfeiffer bacillus, although evidently of a much milder strain than the type which prevailed in the pandemic of 1889. This epidemic though of remarkable mildness in the two months from April 15 to June 15, has within the past four weeks shown certain characteristics which indicate the kind of increasing virulence with which bacteriologists are familiar in the case of strains of pneumococcus passed rapidly through a succession of susceptible animals such as the rabbit. Onset with temperature of 104, projectile vomiting, severe headache, Kernig's sign and high tension spinal fluid, flowing freely up to 100 cc. has not been uncommon and many cases have been mistaken for, and some have been treated as, meningitis with antimeningococcus serum. No harm, apparently, has come from the use of the treatment and symptomatic relief has often followed the withdrawal of the excess fluid, but confusion is likely to arise when the fluid clear on the first tap becomes turbid with leucocytes from the reaction following the introduction of the antimeningococcus serum. If the meningococcus is not found on smear or culture it is well to be satisfied with withdrawal of fluid and not to give serum. Pneumonias have been more common sequellae in July than in April.

Prompt hospitalization effectively guards against serious sequellae and is still the best treatment to be offered. Relief from headache by aspirin, abundant use of water internally, gentle laxative, and, when the temperature has fallen, a nourishing diet, have seemed to be the approved treatment. The same warning should be given now as always in treating influenza, i. e., warn against premature return to hard work. The epidemic is about at an end so far as

A. E. F. troops are concerned and has been throughout of a benign type, though causing considerable non-effectiveness.

Urticaria and Acidosis.

These affections have been reported in considerable numbers and the following quotations from a divisional sanitary report bring up important questions of dietary for consideration. "The food has lacked the proper balance and the demonstrable result which has followed is, that in personal examination of about five hundred men, taken from different organizations, there is a wide-spread existence of urticaria, attributable, in part at least, to the use of native acid wines. A considerable amount of native wine is consumed by men of this command. The excessive use of this wine is injurious to American soldiers. Our soldiers have been accustomed to the use of sweetened soda waters and other non-alcoholic drinks, which at various camps in the United States were used in large quantities. Our soldiers make use of French wines to a large extent because it is the only beverage which can be purchased locally. When consumed in large quantities it is injurious, not only on account of the alcohol, but also on account of the acid which it contains. Instances of diarrhea have been manifest, but of short duration. Upon each occasion, investigation has revealed the source of the difficulty, and upon correction of the cause, a prompt return of good health ensued. The causes have been largely due to moldy bread and the ingestion of insufficiently cooled meat.

It is evident that the existing diet is exceedingly deficient in its sugar component. The use of syrup of fruit extractives, liberally supplied with sugar and water, would have beneficial results by reason of the several following advantages: *a*) To supply deficiency in sugar. *b*) Cause additional amount of water to be ingested. *c*) Replace native wines, thereby lessening the prevailing intestinal intoxication which has produced urticaria, and decrease the pyodermic hazard. *d*) Promote efficiency by reducing the amount of alcoholic intoxication.

The matter of cooking and addition of fresh vegetables to the diet of the men is an important one. It is possible in this district to buy a number of different kinds of fresh vegetables such as spinach, asparagus, fresh onions, cauliflower, cabbage, and rhubarb. The issue of rations in kind which are shipped from the Central Supply Depot does not provide for these articles. Fresh vegetables cannot well be purchased by the Central Supply Depot, and, if supplied from there, would lose much of their value on

account of delay in shipment. French troops in this area make use of fresh vegetables which are procured from local farmers, and they are thereby able to give their men better diet than that which is supplied to American soldiers. The allowance of the saving privilege for purchase of fresh vegetables is strongly recommended."

The Medical Officers' Responsibility.

In a summary of studies upon the disabilities in the sphere of psychopathology, the following statement of the medical officers' responsibility was made in a British publication.

"If we survey the present day field of psychopathology, I think the most comforting piece of scientific knowledge the war has brought to us is that the resistance which the physically sound person has against the injurious circumstances of war is extraordinarily great; that the popularly held opinion concerning the damaging influence of over-exertion and emotion upon an ordinarily sound, healthy mental constitution is not true. This information must be reflected in every consideration of capacity for service. Every pension wrongly granted after discharge from military service damages our social body in a twofold manner. The wrong granting of pension is the lesser of these, the hindering suggestion of incapacity for work which we give to the man in his life is far greater. Every workman will be necessary in the coming times of peace, and we doctors therefore carry on our shoulders a very great part of the responsibility for the return of the discharged soldiers to work; on the grounds of false humanity we have no right, at the cost of the community at large, to give to these men too freely."

Fly Prevention.

The tangle-foot wire is used on a large scale and with excellent results in the B. E. F., as many as 10,000 such wires being distributed each week by the sanitary section in charge of a collection of hospitals and convalescent camps at one Base.

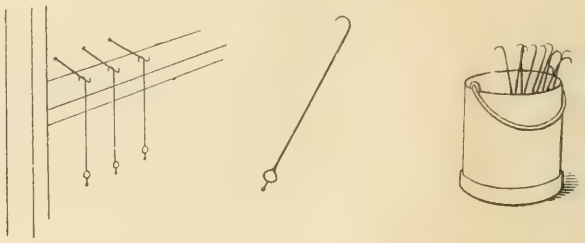
Heat 4 pints of castor oil in an open pan. Stir in 9-1/2 lbs., crushed resin. Continue heating and stirring for about one hour until the resin is dissolved and the mixture is of paint-like consistency.

Apply to wires with brush or by dipping while mixture is still hot.

When wires become covered with flies, collect, place in fire, burn off flies, wipe dry with rag or newspaper, re-coat and re-hang.

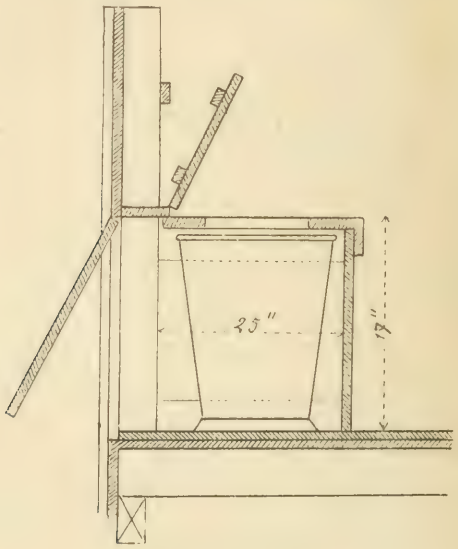
In the first ten days of July, 12 cases of amebic dysentery were reported. In April, May and June there were three cases each

month. The increase of dysentery with hot weather reminds us that in spite of the relatively small amount of fly breeding in France as compared with the United States, we must put human



A B C

A. Method of hanging wires. B. Detail of wire. — Hay bale wire 2 ft. - 0 in. long.
C. Cresol can carrier. Rope handles.



FLY-PROOF LATRINE

If concrete floor is built place nailing blocks in floor.
Minimum distance between seat holes is 1 ft. - 0 in.

excreta out of reach of flies, and keep flies away from food. Careful carpentry will make a latrine fly-proof. Incineration is the best method of feces disposal.

Beware of Acid Solutions of Arsenobenzol.

At a Base Port it was found that five syphilitics had been treated with *arsenobenzol* in acid solution and in high concentration, the surgeon supposing that he was using novarsenobenzol. This mis-

take has also occurred at at least one base hospital. The arsenobenzol is much more readily soluble in water than the salvarsan which we have in the U.S. This encourages such a mistake. The five cases above-mentioned were desperately sick and ended by having pneumonia with bloody expectoration, but all recovered. Such a mistake can obviously not be made often without an occasional fatal result. Arsenobenzol corresponds to salvarsan and requires dilution and alkalinization. Novarsenobenzol, which corresponds to neosalvarsan does not require alkalinization. If the arsenobenzol brand of arsphenamin made in the United States is used as directed, i.e., accurately diluted and alkalinized, it will produce no untoward results.

A report in the *Journal of the American Medical Association* of May 18, 1918, p. 1458, by Capt. Meddis and Lt. Stirling, M.R.C., upon 1,104 injections of arsenobenzol at Camp Zachary Taylor at Louisville, Ky., presents the following conclusions: " 1. The arsenobenzol brand of arsphenamin made in this country (U.S.) is in our experience non-toxic, and as efficient therapeutically as the original Ehrlich preparation. 2. It may be used in concentrated solution with no ill effects. 3. Epinephrin, given in a 1 : 1,000 solution ten minutes before the injection, will control reaction. 4. The only reaction noted in this series of cases was slight headache; in some cases, diarrhea and slight malaise were noted. 5. In phagedenic chancroids, " arsenobenzol " has a very beneficial effect, and is recommended where the healing is slow and response to other treatment is poor. "

When Not to Operate in Tuberculosis of the Kidney.

A number of cases of tuberculosis of the kidney have been diagnosed and operated upon in the A.E.F. Unfortunately the wound in the loin often breaks down and takes from three months to a year to heal, during the greater portion of which time it is improper to move the patient from the hospital. This complication is so common and need for operation in these cases so little pressing that surgeons are urged not to perform it on this side of the water, but to send the patients home with a diagnosis for operation.

Death from Infectious Jaundice.

Private..... Engrs. 28, white, nine months in service, admitted to a Base Hospital June 7th, diagnosed " cholecystitis acute, catarrhal and jaundice, acute, infectious, " and died June 26th. Jaundice 21 days, no nausea, no enlargement of liver. At first no

abdominal tenderness, later in upper half, pulse 60. Important findings at necropsy were, — " Bronzed skin, undernourished; peritoneal surfaces smooth, no increase of fluid, loose adhesions about gall bladder. Brown pigmentation of heart. Edema of lower lobes of lung. Spleen normal. Liver: gall bladder small, walls thickened, contains thick bile-stained mucus. Mucosa pale and normal. Bile passages patent and normal. Liver small, dark red, flabby, leathery, lobules distinct, small areas of yellow. Entire organ jaundiced. Intestines contain bile — colored feces. Kidneys: large, cortex thick glomeruli red, organ jaundiced. Anatomical diagnosis: Fibrosis, fatty degeneration and necrosis of liver, chronic cholecystitis of Kidney. Bacteriological: no growth from heart or spleen. Probable cause of death: infectious jaundice. "

Increase in Strangulated Hernias in Germany.

An unexpected result of the low-fat or diet in Germany has been a great increase in the number of cases of strangulated inguinal and internal intestinal hernias, requiring immediate surgical treatment. To the disappearance of adipose layers around the intestines, lack of peritoneal support for bowels, and increase of cellulose in the food which stimulates intestines to greater activity are attributed the increase.

Mange a Human Affection During This War.

(Extract from " Medical Supplement " Feb., 1918) — *Horse Mange*: — In peace horse mange was not common in the Central Empires, but during the war it has been imported from Poland and Serbia and has spread to man and even from man to man; Pick, who examined a number of cases in unfavorable circumstances, thus contracted it. He has never seen dermatokoptes or dermatophagus mange but always the sarcoptes form. The incubation period is short, two or three days, and then groups of small pale nodules the size of a pin's head appear on the back, trunk, flexor surfaces of the upper extremities, groins and thighs, the distribution being ascribed by Reif to hair and scales falling down inside the collar. The wrist, hands, penis, face and scalp escape. As in scabies, itching, when the patient gets warm in bed, is troublesome; but, unlike scabies, there is no associated impetigo or eczema. Burrows are not seen, probably because the parasite is more superficially placed than the Acarus scabiei in the skin. Spontaneous cure occurs in one to three weeks. Prophylaxis consists in washing with carbolic soap, or rubbing on petroleum after working in the stables.

As a cure Weidner speaks highly of petroleum (3 i), rubbed on the skin until it is dry, once daily; mild cases are cured by a single application, severe ones after two to four. The clothes and bedding should be disinfected.

Eczema Marginatum.

This familiar disease due to Epidermophyton inguinale and better called tinea marginata has become extremely common in the Central Empires, and according to Galewsky is often caught in baths and latrines. Unless carefully disinfected the thermometers in hospitals may spread it. Schillenberg recommends artificial sun baths as better than ordinary iodin treatment. In extensive or chronic cases Muller observed excellent results from exposures to a quartz lamp at a distance of 30 to 65 centimeters for 5 to 30 minutes.

Trachoma Among Chinese Laborers.

Where Chinese laborers are used, precautions must be taken to avoid the introduction and spread of trachoma among the American Expeditionary Forces. Trachoma is common among the Chinese, and some of the large Chinese labor camps of the B. E. F. provide for three groups, those who have active discharging and infective conjunctival lesions, those who have the disease in the quiescent and non-infectious stage, but in whom irritation or inflammation of the conjunctiva from other cause may develop a recrudescence, and those with normal conjunctivae. An acute outbreak of conjunctivitis was recently reported among the Chinese working at one of the camp hospitals.

Rabies.

Again a warning has been issued by the French health authorities as to the dangers of rabies, a marked increase in the number of rabid dogs having occurred in March, April, and May. Rabies is common throughout France. One death from Rabies in the A. E. F. has been already reported. Report of dog bites should be made to medical officers so that suitable treatment of the wound may be given. The dog should be held for observation under authority of the local French Veterinary service. If antirabic treatment is considered necessary the Central Medical Department Laboratory at Dijon should be notified promptly.

Anthrax.

There have been 13 cases of anthrax in the A. E. F. since March 30th. Of these all but two occurred in men who had just

arrived on transports, or developed during the voyage. Of the other two one developed the lesion at the site of a cut made while shaving. In several lots of shaving brushes collected from among arriving troops the bacillus anthracis has been found by bacteriologists in England and in France. Cases have recently been reported in the United States from several of the cantonments. A special study of the industry and the source of the infected bristles (imitation badger hair) which are supposed to be horse hair from endemic centers of anthrax in Siberia, Manchuria, or Argentine is now being made by the United States Public Health Service. Any information as to place and time of purchase and make of shaving brushes which have been used by patients found suffering from anthrax will be helpful in tracing and discontinuing the source of the infection. Appropriate and prompt surgical treatment of localized lesions, supplemented when indicated by specific antiserum (obtained on request from the Pasteur Institute in Paris) will save life in cases correctly diagnosed. The following errors of diagnosis have been reported.

1. Anthrax of neck : primary diagnosis, cellulitis of neck following vaccination.

2. Anthrax of neck : primary diagnosis unilateral mumps.

3. Anthrax septicemia : primary diagnosis, meningitis.

4. Staphylococcus abscess of neck : primary diagnosis, anthrax.

Suspected anthrax has been reported in the following organizations.

308 Field Artillery, Battery A.

309 Field Artillerie, Cos. B. & D.

303 Trench Mortar Battery.

403 Ammunition Train, Hq. Co. Cos. C. & D.

115 Field Artillery, San. Detach. Bty. E.

303 Supply Train, Co. E.

303 Motor Supply.

Differential Diagnoses of interest in the past week.

1. Reported dysentery; correct diagnosis, syphilis.

2. Reported typhoid : corrected diagnosis, bronchitis.

3. Reported suspected meningitis (50 cases), corrected diagnosis epidemic " Three day fever ".

4. Reported suspected typhus or typhoid : correct diagnosis miliary tuberculosis.

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